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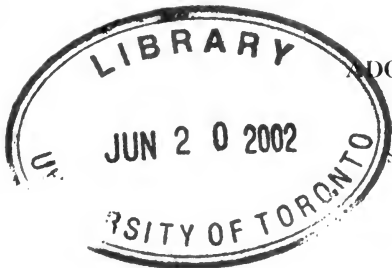
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ADOLF ALT, M.D.,
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ST. LOUIS, MO.

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THE AMERICAN JOURNAL ... OF ... OPHTHALMOLOGY.

VOL. XVI

JANUARY, 1899.

NO. 1.

ORIGINAL ARTICLES.

THE CURE OF CATARACT WITHOUT OPERATION.¹

BY ADOLF ALT, M.D., ST. LOUIS, MO.

WE are in the habit of considering this age as one especially favored in comparison with the preceding ones on account of its so called enlightenment and its progressed and ever-progressing education of the masses of the people. Yet, no day passes in which we are not, in spite of all this, brought forcibly in contact with the unchanged credulity, superstition, admiration for and seeking after the mysterious by the people which all enlightenment and knowledge do not seem able to dispel, which appear even to be ever on the increase. While these conditions prevail more or less in all branches of learning, no profession, perhaps, is as frequently made aware of their baneful reign than the medical profession. To try and fathom the depth of these depressing facts, to put the blame where it rightly belongs and to suggest remedies is not, however, the purpose of this paper. The old addage, that where there is much light there must be much shadow is, of course, the worst kind of an apology for consolation.

As far as *we* are herein concerned, the most pregnant result of these existing conditions is that quackery is ever and increasingly rampant and holds its hollow pumpkinhead erect and proud as if it was filled with gray cerebral substance to its very core.

¹Read before the St. Louis Medical Society, December 17, 1898.

All of you have seen in numerous journals and magazines the continued advertisements of the "absorption cure of cataract" adorned with glaring announcements and testimonials of its efficiency, especially by the clergy, the application of which evidently pays so well that rival institutions are already trying to rob the original one of its unjust gains. Probably all of you have within a few months past received a pamphlet with a title similar to the one of this paper, issued by a homœopathic drug firm of this city, in which we are assured that the instillation of the extract of *cimifuga maritima* has cured and will cure cataract. This is apparently proven by a large number of testimonials from unknown sources, names with the letters M. D. attached and others without them. Yet, with all their boasting this firm refuses to submit any of this fine product for scientific investigation. At best, it is only the revival of a dream which had an ephemeral existence some ten or twelve years ago.

There is an older quack method for the cure of cataract which is still practiced in this city by some spectacle venders with a stretchy conscience, that is, the selling of glasses which are guaranteed to cure cataract. Furthermore, there is Christian Science, which is neither Christian nor scientific, working in this field. Another competitor, for all I know, is that other thing which by the grace of our honorable and enlightened Governor has been duped a science, and like many a highway-robber of yore has thus been adorned with the golden spurs of honorable knighthood.

All of these methods, and a great many more of which I know nothing, promise a more or less speedy cure of cataract without operation. As bad as this is, we will be charitable and state that if the quacks could not really and truthfully now and then point to a case of cataract in which an imaginary or apparent improvement, or even a cure, has taken place while the patient was under this or the other one's care (and in spite of it), they could not possibly in such a manner hoodwink and lead by the nose an intelligent and enlightened public as *we* are, in particular, wont of considering the people of this our own country.

It is the object of this paper, then, to relate to you briefly what is scientifically known as regards the possibility of an improvement or cure of cataract without operation and to

show you that there are such cases which these quacks may occasionally claim as their own, while better knowledge will show them to be Nature's cures. Of course, my remarks refer only to forms of real cataract, that is, intra-capsular opacity of the crystalline lens, and not to the various forms of corneal and other affections which are often erroneously called cataract by the ignorant.

In the consideration of these occurrences it is, however, well to state plainly, that in the vast majority of the cases a cataract once begun will, if the patient lives long enough, progress to total dimness of the lens and practically to blindness. This is the rule—every other ending, except the cure by over-ripening which we will detail later on, is a rare exception.

In the very first beginning of the formation of a cataract, or even at a later period, patients not infrequently become aware of an improvement in their vision. This occurs in people with a hypermetropic refraction with or without presbyopia and in myopes in which the presbyopia had outbalanced the myopia. Such patients find out that they can lay their glasses aside or can at least get along with weaker ones than they used to wear. This apparent improvement of the refractive condition of such eyes is probably due to a swelling and consequent increased convexity of the crystalline lens from imbibition with fluid from its surroundings. In this manner what may be called a lenticular myopia is produced and as long as this myopia nearly or exactly offsets the pre-existing hypermetropia or presbyopia, the patients think that their eyes are really getting stronger. Yet, the ophthalmoscope may show that their cataract is quietly progressing while they rejoice at their improved sight. Only, when the increasing lenticular myopia forces patients to wear concave glasses instead of their convex ones for distant vision, or when they have to use concave glasses for the distance, while formerly they could see well without any, the patients usually get conscious of the fact that there is something wrong with their eyes and they seek medical aid. Not only have I for many years considered such a change in the refraction as an indication of the coming on of a cataract, but this condition furnishes undoubtedly also the explanation for many a case of so-called second-sight.

In the development of almost every case of cortical cataract there comes a time when for another reason patients notice

an improvement in their already quite impaired vision. This is the very period that the spectacle venders and other quacks count upon in promising a cure of the cataract by the use of their wares. In such cases the patients themselves believe, that the remedies, whatever they are, are actually curing their eyes. The explanation of this improvement of vision during the progress of a cortical cataract lies in the fact that as long as the cataract has not reached a certain stage the opacities, forming more or less radius-like striæ, are very unequal in density and leave clearer spaces between them. The extremely irregular refraction of light passing through and between them caused thereby produces a very confusing image. When, however, this condition has progressed to one of more uniform dimness, although interfering materially with vision, it allows of a more uniform refraction of the light entering the eye and the picture received, though dim, is much less confusing. This condition, however, marks only a stage in the progress of the cataract and the apparent improvement is again lost and gives way to greater dimness of vision as the cataract advances.

However, all cataracts do not progress in the same ratio nor in the same manner. There are almost as many variations as there are cases. It is, therefore, impossible and consequently very inpolitic for the physician to even approximately predict the time when a given cataract will be complete enough to be called ripe and ready for operation. The time from the beginning to the full ripeness may extend from a few days (as in traumatic cases) to many years. I know patients who are afflicted with cataracts in whom I have observed no progress of the opacity or but very little in many years, in one case for twelve years. Allport (*AMERICAN JOURNAL OF OPHTHALMOLOGY*, February, 1896) reported a case in which no progress had been observed even for about twenty-five years.

In the cases just mentioned no form of treatment has been attempted with the direct aim of retarding the progress of the cataracts. If, however, cataract is, as by many it is thought to be, the result of malnutrition, then a trial to influence its progress by means of appropriate methods of treatment in order to remedy the existent general ill-health of the body and the malnutrition of the eye especially, is not only justified, but even demanded. Some sixteen years ago these considerations led M. Landesberg, then of Philadelphia, who believed that

cataract was due to some choroidal disease, to try whether the nasal forms of treatment for choroiditis would not also beneficially influence the resulting cataracts. What he expected, evidently occurred, for he was enabled in a short time to report a series of cases in which such treatment had improved and even cured incipient cataracts. I have tried the same procedures quite a number of times and have repeatedly had occasion to treat patients who had an evident choroiditis and incipient cataract at the same time, but in most cases, while the choroidal trouble became stationary or yielded to the treatment, the formation of the cataract went on undisturbed in its slow and steady progress. In some cases the cataract, as long as I had a chance to observe them, remained stationary. In two or three cases the opacities seemed for a time to retrograde, but the patients, thinking themselves, perhaps, cured, disappeared from my hands and their further history is not in my possession.

More recently J. H. Woodward, of New York, read a paper before the New York State Medical Association, in which he reported thirty-seven cases of cataract in which he thought that by his management he had at least retarded the progress of the opacity. This management he sums up in the following words: "To do what was possible to maintain, within the limits compatible with health, the nutrition of a structure not itself provided with blood vessels. In order to accomplish this purpose it is necessary to provide for the well-being of the general economy, as well as to establish a proper régime for the organ itself." From his experience with these cases he draws the conclusions that "(1) in the natural course of senile cataract there is *not* a progressive loss of vision; (2) that improvement of vision in such cases is often observed; and, (3) that complete cataractous degeneration of the senile type is a process often requiring many years for its consummation."

While, then, in his cases this complete cataractous degeneration has not yet been consummated, it is very likely that, if Woodward and his patients live long enough, the time will come when even in these thirty-seven cases this state will be reached. In relying so firmly on his method of management of these cases, while it in itself is rational and probably the best that can be given, he is, I am afraid, in a similar position in which some twenty years ago Neftel, of New York, found

himself (*Medical Record*), who was firmly convinced that he had not only retarded the progress of some cataracts, but even cured some by the application of the constant electric current. He discharged his patients as cured and other ophthalmologists removed their cataracts. Thus are we ever prone to believe that which we wish for.

Still, there are undoubtedly rare cases in which beginning opacities of the crystalline lens clear up again and disappear. I have had occasion to see this in a case in my immediate family, where a number of very decided and easily visible striæ of opacity have appeared in the peripheral cortex of both lenses and disappeared gradually under treatment for dropsy of the lower limbs due to an obscure cause, but probably an abdominal tumor. After the disappearance of these opacities the lenses were again apparently normal.

Seegen and Gerhardt have seen similar occurrences in diabetics, so has Nettleship. Such a case observed by Nicati showed at the same time a high degree of myopia and this author explained this myopia by imbibition with aqueous humor through the lens-capsule. Schmidt-Rimpler, in commending on the case (*Berliner Klin. Wochenschr.*), thinks this explanation to be the wrong one, yet as long as no other is offered, it seems to me to be the most plausible one.

In traumatic cataracts, especially in cataracts due to a contusion of the eyeball, the disappearance or at least the decrease of the visible opacities has undoubtedly been repeatedly seen by every ophthalmologist of experience.

A comparatively more frequent method, by which Nature, unaided by us, can and does bring about a cure of cataract, is by gradual over-ripening and softening of the cortical substance by imbibition, afterwards followed by its solution and gradual absorption through the intact lens-capsule. When the first cases of such a spontaneous cure were reported, in 1885 to the Heidelberg Ophthalmological Society, by Brettauer, they were looked upon as very doubtful by the majority of ophthalmologists. Yet, such observations have since steadily grown in number, so that Natanson, of Warschau (*Zehender's Monatsbl.*), in April, 1898, could already refer to about fifty, including his own. These had been reported by Brettauer, Czermack, Higgins, Lang, Mitvalsky, Robinson, Nordmann, Panas, von Wecker, Gardner, Schneidemann, Schramm, Eg-

bert, von Hippel, Delbès, Bitzos, Baquis, Krükow, Natanson, and myself. To these in October, 1898, *Berl. Klin. Wochschr*), Schmidt-Rimpler has added two more.

Absorption of the lens after rupture of its capsule either by the hand of the operator as in the operation of discission, or by a penetrating injury is, of course, not referred to in these cases. They are all cases of spontaneous absorption of a cataractous lens (chiefly their cortex) through a macroscopically intact lens-capsule. In such cases we must assume that the cataract, not having been operated upon when in a state of ripeness, has progressed by further degeneration of the lens-tissue to the Morgagnian state, that is to softening and liquifying of the cortex and that this fluid cortex has in some manner become absorbed. The final result as far as observed has been, that the anterior and posterior lens-capsule were found collapsed, and enclosed between them, usually in the lower part of the otherwise empty capsular sac, lying a small nucleus, which, too, in some cases, showed signs of erosion. In a few cases even this remnant of a nucleus was absent and nothing but the collapsed lens-capsule was found lying in the pupillary area as a wrinkled grayish membrane, more or less transparent, sometimes showing small flakes and crystals of lime. Sometimes a partial free pupil had resulted from a tear in the suspensory ligament. In such cases, then, after a period of blindness due to ripe cataract, a gradual improvement of vision which may attain a very high degree takes place by means of the gradual melting away and absorption of the tissue which we otherwise remove by operation. It takes usually from ten to twelve years to accomplish this. The vision so obtained would on an average, perhaps, be better still, were such cataracts less frequently complicated with other eye diseases. The most frequent complication, thus far observed, has been glaucoma. With regard to the pathology of these cases but little is known. Mitvalsky states, that with the microscope he could not detect a single cellular element in the remaining capsule and von Hippel found only very few epithelial cells and these took up stains very badly. In one case of my own I found no cells in the lens-capsule but a great many droplets of Morgagnian fluid which had not yet become absorbed.

Last year I had occasion to see another manner of spontaneous cure of a traumatic cataract, which, however, had pre-

viously been described by others. An eye had been injured by a minute flake of iron which, having pierced the cornea and iris, entered the lens-capsule and caused a traumatic cataract. The attendant inflammation subsided under my care and finally a quiet eye with good perception and projection of light resulted. This cataract progressed and I expected to extract it at no distant date, when one day the patient came to tell me that he had suddenly recovered his sight. I found some rusty-colored lens-substance lying at the bottom of the anterior chamber which had escaped from the capsule by means of a large tear which started from the original wound in the capsule and ran across the pupillary space to its opposite periphery. There was but very little lens-tissue left in the collapsed sac and his vision with a correcting glass was fair.

From the foregoing it is clear that spontaneous retardation in the development of a cataract, temporary improvement of vision, disappearance of certain opacities, absorption of most of a cataractous lens through the uninjured lens-capsule, even the evacuation of a cataract by the bursting of the capsule are facts known to occur. Indeed they occur frequently enough to allow the ignorant now and then to point to an apparent or real cure of a cataract without operation and thus to give apparent strength and support to the claims of the wily quack.

We learn, however, something more from these observations and that is, that in cataract as in a good many other pathological conditions, we should not be too hasty in making the patient aware of his trouble and if we must let them know, not to give too definite an opinion as to the time it is likely to take until the cataract will be ready for operation. Thus we will save our patient some of the attendant anxiety and ourselves sometimes a feeling akin to that of the weather prophet when the bright sun shines instead of the cloudy weather he predicted. And as to the patient—well, he will keep on going to the quack and swearing that his medicine has done him good, even if you have afterwards occasion to extract his ripe cataract.

OBSERVATIONS ON THE USE OF PROTARGOL IN DISEASES OF THE EYE.

BY PROF. DR. BOL. WICHERKIEWICZ, CRACOW.

AMONG the various silver preparations the best is undoubtedly protargol, and to Neisser belongs the great credit of having first tested and recommended this remedy.—(*Dermat. Centralblatt*, October, 1897).

Since then others, Darier,¹ Deneffe,² Roose,³ Bossalino,⁴ Ginestous,⁵ Fuerst,⁶ etc., have employed this remedy with more or less good results. The writer has also made use of protargol, first in the form of a 5 and later of 10 and 20 per cent. solutions in the treatment of acute granular and catarrhal conjunctivitis, but found that the results obtained were not especially noteworthy. His second series of experiments related to ulcers of the cornea. In cases in which the ulcers were of infectious character, and especially those due to gonorrhœal conjunctivitis, a distinctly favorable influence was derived from protargol in 5 per cent. solutions in connection with the treatment directed to the primary diseases. When, however, the ulcers were of metastatic character, or due to other causes, the curative effect of the drug was not especially marked.

The third series of experiments was made in cases of supuration of the lachrymal sac. This is an affection in which the remedy has proved of signal service. Cases which had previously been treated without success by means of various customary methods for a number of months, were greatly im-

¹Darier—The New Silver Salts and Their Application in Ophthalmia. *Ophthalmologische Klinik*, No. 5, 1898.

²Deneffe—Protargol in Ophthalmology. *Bulletin de l'Academie Royale de Belgique*, 26, February, 1898.

³Roose—Protargol in Ocular Therapeutics. *Annales de l'Institute Saint-Antoine à Coutraï*, April, 1898.

⁴Bossalino—*Riforma Medica*, No. 5, 3, 1898.

⁵Ginestous—*Gazette hebdomadaire des Sciences medicale de Bordeaux*, May 15, 1898.

⁶Fuerst—*Fortschritte der Medicin*, No. 4, 1898.

proved or cured under the protargol treatment within a short time.

The treatment was as follows: After the lachrymal canal had been split open sufficiently to permit of the easy introduction of a fairly large canula of a lachrymal syringe, the lachrymal sac was irrigated with boric acid solution until the returning stream of water was clear, and then with the same syringe a 10 to 20 per cent. protargol solution was slowly injected. The previous cleansing of the mucous membrane of the lachrymal sac is of the greatest importance, in order to derive the full effect from the remedy and facilitate its deep penetration into the tissues of the mucous membrane. Even a single thorough application of protargol has produced a marked improvement in such cases. The secretion, which previously had been purulent, now assumed a mucous character and decreased in quantity, the improvement continuing under the same treatment, and being especially rapid in cases in which it was possible to make the injections twice daily. The treatment, however, must not be interrupted too soon, and not even at the time when the secretion has ceased, as otherwise recurrence is apt to take place. It is, therefore, advisable to continue the treatment for eight to fourteen days after the arrest of any discharge.

After the lachrymal mucous membrane has been so influenced by the protargol injections that the secretion loses its purulent character, a mucous discharge not infrequently persists, and examinations with the sound reveal a swelling of the lining membrane of the entire lachrymal apparatus. In such cases it is necessary to employ instead of, or in connection with protargol, astringent solutions (zinc sulphate, copper sulphate and copper aluminate) of a strength of $\frac{1}{2}$ to 1 per cent. If, under this treatment, the swelling of the mucous membrane decreases, then it not seldom happens that the previous occlusion of the nasal lachrymal duct disappears.

In my fourth series of experiments relating to specific ophthalmic blennorrhœa of the new-born and of adults, protargol has not been surpassed by any other remedy. The results, indeed, were so striking, that I am forced to regard protargol as a sovereign remedy in this form of blennorrhœa, and I am enabled to enthusiastically confirm the statement of Neisser, that "all the brilliant expectations which

have been theoretically entertained with regard to protargol have been completely realized in practice."

The method adopted by me was as follows: After the conjunctival sac had been thoroughly irrigated with boric acid solution or sterilized physiological salt solution, the upper lid was fully everted, so that the entire canthus was brought to view. This exposed conjunctival surface was then mopped with a pledget of cotton soaked in a 20 per cent. protargol solution. The same procedure was carried out in the lower eyelid. A 3 per cent. boric acid, or 1-10,000 sublimate salve was then applied between the lids and ice compresses ordered—if they were well tolerated. Besides this a 1 per cent. protargol solution was instilled by the attendant or members of the family every two hours. Under this treatment the discharge rapidly decreases, and above all loses its purulent character. The marked swelling of the lids visibly diminishes and the conjunctival mucous membrane, which previously was greatly swollen and had presented a greyish appearance, rapidly returns to a normal condition. While previously it had been difficult to separate the lids, the patient is able to open the eyes freely after a few days. In cases which came under the treatment at an early date, corneal ulcers never appeared, and if they had formed before adopting the treatment, they became rapidly clean and as a rule ceased to spread.

One of the reasons why the remedy was so well tolerated by the patients is, that its application is unattended with pain, a point in which it appears to advantage in contrast with nitrate of silver.

It is worthy to note here that cases of argyrosis of the conjunctiva were never observed.—(*Die Ophthalmologische Klinik*, No. 18, 1898).

CONCERNING THE FINAL RESULTS OF THE OPERATIVE TREATMENT OF MYOPIA.

BY DR. O. SCHEFFELS, KREFELD.

SINCE Fukala's first communication in 1890 on the operative treatment of high-grade myopia, whole series of hundreds of cases of such operations have been published and

there are to-day probably but few ophthalmologists who still refuse to perform this operation and therefore have not gained some experience in this field which is so highly interesting and so full of responsibility.

I am of the opinion that these, partially very extensive, reports of series of cases show a remarkable deficiency in this point, that they give only the immediate conditions following the operations and make no statements as regards the later behavior of these eyes. According to my experience, however, these operated eyes still undergo certain changes in the course of the following years, which I do not find reported in literature.

Four and a half years ago I performed my first myopia operation; a few weeks ago the fifteenth. They all took a very satisfactory course, so that I am as contented with the results as were the operated patients. I have taken particular pains to keep every one of these patients under observation until to-day and at intervals of about six months I have been able to examine the condition of each of these eyes. This would, of course, be impossible in a large clinic, where patients come from all sides and again disappear.

Although my series of observations is small, it is at least continuous and uniform.

The prime question, whether, after the operation the myopia does really not progress, is certainly the most interesting, if not the most practical, one concerning the whole operative treatment of myopia. This question to-day is yet an altogether open one. It can, of course, be decided definitely only after a longer period and by means of a very large material for observation. Yet, I think, that we are already in the possession of observations, which afford us certain points from which to form a judgment. In my opinion it is very interesting to know the experiences which cover a space of from two to four years after the completion of the whole operative procedure, that is, after the total absorption of the lens and the formation of an absolutely clear pupil. The first ten of my fifteen cases fulfill these conditions. I desire to report shortly on these ten cases, concerning eight patients, and in order to avoid being dilatory I shall in this report mention only such facts as are of interest in the question as put.

Diverse authors have set the lowest limit for operative in-

terference at 15 D. In reporting the cases of myopia of a lesser degree, in which I operated, I have shortly given my reasons for doing so. In answer to the question, whether to operate on one or both eyes, I consider, that on general principals binocular operation is the more desirable on account of the high degree of anisometropia. Yet, this point must be decided on for every case individually, since it may be necessary to preserve the myopia in one eye in order to retain good near vision. On the other hand, we may well be guided concerning this point by the wishes of intelligent patients.

CASE I.—Lady, aged 17 years; R. E. 20 D. Temporal conus, $1\frac{1}{2}$ papillæ in width, moderate lack of pigment in the circum-papillary choroid; parallaxic movement of the nasal retinal vessels plainly seen.

Operations: January 20, 1894, discession. January 26, linear extraction. February 20, discession. March 15, pupil perfectly clear, not a trace of opacity. This remains unchanged until spring, 1878, when a fine secondary cataract is formed. April 21, 1898, discession. April 23, pupil again perfectly clear.

Vision: January 19, 1894, with -20 D. $V.=\frac{5}{L}$; Niden I at 5 cm. March 15, 1894, with $+0.5$ D. $V.=\frac{5}{xx}$; Niden I at 25 to 35 cm. with $+4$ D. April 25, 1898, E. $V.=\frac{5}{xx}$; Niden I at 25 to 35 cm. with $+3$ D. Ophthalmoscopic condition unchanged. Diminution of refraction in four years = 0.5 D.

CASE II.—Boy, aged $13\frac{1}{2}$ years; R. E. = 14 D. Apprenticed to a harness maker, dismissed by his master as utterly unfit. Later on, perfectly fit for harness-making, he urgently desires the operation on the other eye. Small temporal conus; fundus albinotic.

Operations: August 15, 1894, discession. August 23, linear extraction. September 20, pupil perfectly clear; remains so until May 1, 1898.

Vision: August 14, 1894, with -14 D. $V.=\frac{5}{L}$; Niden at 7 cm. September 20, 1894, with $+3$ D. $\bigcirc + 1$ D. cyl. $V.=\frac{5}{xx}$; Niden VI at 25 to 30 cm. with $+6$ D. $\bigcirc + 1$ D. cyl. May 1, 1898, with $+1.5$ D. $\bigcirc + 1$ D. cyl. $V.=\frac{5}{xv}$; Niden I at 25 to 30 cm. with $+5$ D. $\bigcirc + 1$ D. cyl. In three and a half years decrease of hypermetropia = 1.5 D. Ophthalm. stat. id.

CASE III.—Laborer, aged 25 years, L. E., 12 D. About to lose his job of turning in a machine factory on account of unsatisfactory work. Regains full working faculty using the

operated eye for work, the unoperated one occasionally for exact near vision. Temporal conus $1\frac{1}{2}$ papillæ in width; oblique position of papilla; diffuse lack of pigment.

Operations: September 3, 1894, discission. September 17, linear extraction. September 9, discission. November 2, pupil perfectly clear and remains so until May 8, 1898.

Vision: September 2, 1894, with -12 D. $V.=\frac{5}{x}$; Niden I at 9 cm. November 2, 1894, with $+4.5$ D. $\bigcirc + 1$ D. cyl. $=\frac{5}{x}$; Niden I at 20 cm. with $+9.6$ D. May 8, 1898, with $+4.5$ D. $\bigcirc + 1$ D. cyl. $=\frac{5}{x}$; Niden with $+9.6$ D. at 20 cm. No decrease of hypermetropia in three and a half years. Ophthalm. stat. id.

CASE IV.—Lady, aged 37 years, R. E., 16 D., macula corneæ. Large ring-shaped conus; extensive choroiditic foci like areolar choroiditis; the well-known glistening white streaks in the macula, reminding one of cracks in an enameled surface; no vitreous opacities.

Operations: December 5, 1894, discission. December 22, linear extraction. January 17, 1895, iridectomy on account of increased tension. February 6, discission. March 1, pupil perfectly clear and remains so until May 1, 1898.

Vision: December 4, 1894, with -16 D. $V.=\frac{5}{L}$; Niden VII at $5\frac{1}{2}$ cm. March 1, 1895, with $+2.5$ D. $V.=\frac{5}{L}$; Niden VIII at 28 cm. with $+6$ D. May 1, 1898, with $+2.5$ D. $V.=\frac{5}{L}$; Niden VI at 28 cm. with $+6$ D. Functional and ophthalmoscopic status idem after three and a half years.

CASE V.—Girl, aged 15 years, R. E. 18 D. Small, well defined, ring-shaped conus; albinotic fundus; on the nasal side shadow of the retina visible.

Operations: January 2, 1895, discission. January 9, linear extraction. January 14, puncture of anterior chamber on account of increased tension. February 2, discission. March 1, pupil perfectly clear and remains so until May 2, 1898.

Vision: January 1, 1895, with -18 D. $V.=\frac{5}{L}$; Niden I at 6 cm. March 1, 1895, with $+1.75$ D. $V.=\frac{5}{xv}$; Niden IV at 25 to 35 cm. with $+5$ D. May 2, 1898, with $+0.5$ D. $=\frac{5}{xx}$; Niden I with $+4.5$ D. Decrease of hyperopia after three years $=1.25$ D. Ophthalm. stat. id.

CASE VI.—Lady, aged 18 years, R. E., 14 D.; same as Case I, urgently demands operation of the other eye. Well

defined, ring-shaped conus, 3 papillæ in width; blood vessels straightened; decided lack of pigment.

Operations: January 2, 1895, discission. January 9, linear extraction. February 27, discission. March 15, pupil perfectly clear. Three months later, slight secondary cataract. July 2, discission; pupil perfectly clear and remains so until May 3, 1898.

Vision: January 1, 1894, with -14 D. $V.=\frac{5}{L}$; Niden I at 8 cm. March 15, 1895, with $+2$ D. $\bigcirc + 2$ D. cyl. $V.=\frac{5}{x}$; Niden I with $+6$ D. $\bigcirc + 2$ D. cyl. at 12 to 50 cm. May 3, 1898, with $+1$ D. $\bigcirc + 1.5$ D. cyl. $V.=\frac{5}{7.5}$ to $\frac{5}{v}$; Niden I at 12 to 50 cm. with $+5$ D. $\bigcirc + 1.5$ D. cyl. Decrease of hyperopia in three years = 1 D. Ophthalm. stat. id.

CASE VII.—Boy, aged 14 years, L. E., 12 D., same as Case II. Both the boy and his parents urgently desire to have the other eye operated. Temporal conus, $1\frac{1}{2}$ papillæ in width; moderate lack of pigment.

Operations: May 2, 1895, discission. May 20, linear extraction. June 15, discission. July 10, absolutely clear pupil. Spring, 1898, fine secondary cataract for which I shall soon operate again.

Vision: May 1, 1895, with -12 D. $\bigcirc - 4$ D. cyl. $V.=\frac{5}{xxv}$; Niden I at 7 cm. July 10, with $+4.5$ D. $V.=\frac{5}{xx}$; Niden III at 20 cm. with $+8$ D. April 15, 1898, with $+3$ D. $V.=\frac{5}{xv}$; Niden III at 20 to 30 cm. with 6.5 D. Decrease of hyperopia in two and a half years = 1.5 D. Ophthalm. stat. id.

CASE VIII.—Boy, aged 8 years, L. E. 10 D. Had to be dispensed from school on account of continued severe accommodative asthenopia and general nervousity; afterwards was free from headache and could go to school. Small temporal conus; great lack of pigment; a choroidal exudation of $1\frac{1}{2}$ papillæ in diameter in the macula which had appeared six months previously and grown rapidly in spite of inunctions, Heurteloup and rest; no vitreous opacities.

Operations: June 15, 1895, discission. June 22, linear extraction. August 24, pupil perfectly clear; remains so until fall, 1897, when a secondary cataract was formed, the removal of which was postponed until school-vacation.

Vision: June 14, 1895, with -10 D. $\bigcirc - 2$ D. cyl. $V.=\frac{5}{xxv}$; Niden I at 10 cm. August 20, with $+5.5$ D. $V.=\frac{5}{xv}$; Niden III at 26 cm. with $+9$ D.; after a year Niden I.

April 16, 1898, with + 3.5 D. $V.=\frac{5}{L}$, secondary cataract; Niden VIII with + 7 D. Decrease of hyperopia in two and three-fourths years = 2 D. The chorioretinitic focus is a third smaller than before; no new changes in the fundus.

CASE IX.—Laborer, aged 39, L.E. 14D. Is to lose his job as dyer on account of unsatisfactory vision, which is rendered perfectly satisfactory by the operation and later on urgently desires operation on the other eye. Well defined, ring-shaped conus; papilla very oblique; blood vessels straightened; considerable atrophy of pigment.

Operations: January 25, 1896, discission. February 2, linear extraction. February 10, discission. March 15, discission. April 15, pupil perfectly clear; remains so until spring, 1898, when secondary cataract appears. April 23, 1898, discission.

Vision: January 24, 1896, with — 14 D. $V.=\frac{5}{xx}$; Niden I at $7\frac{1}{2}$ cm. April 15, with + 2 D. \bigcirc + 1.5 D. cyl. $V.=\frac{5}{xvi}$; Niden I at 25 to 30 cm. with + 6 D. \bigcirc + 1.5 D. cyl. May 3, 1898, with + 1 D. \bigcirc + 1 D. cyl. $V.=\frac{5}{xv}$; Niden I with + 5 D. Decrease of hyperopia in two and one-fourth years = 1 D. Ophthalm. stat. id.

CASE X.—Boy, aged 10 years, L. E. 12 D. Sees unsatisfactorily in school and is utterly unfit to help in his father's business as decorator. Both boy and parents are greatly pleased with the result of the operation.

Operations: February 17, 1896, discission. March 1, linear extraction. April 20, pupil perfectly clear; one and one-fourth years afterwards, fine secondary cataract. July 9, 1897, discission; pupil again clear and remains so until May 3, 1898.

Vision: February 16, 1896, with — 12 D. $V.=\frac{5}{L}$; Niden I at $8\frac{1}{2}$ cm. April 25, with + 4.5 D. $V.=\frac{5}{xx}$; Niden I at 26 to 32 cm. with + 8 D. May 4, 1898, with + 3 D. $V.=\frac{5}{xv}$; Niden I with + 7 D. Decrease of hyperopia in two years = 2.5 D. Ophthalm. stat. id.

The fact that by means of this operation the visual acuity is considerably increased, which had already been sufficiently proven by the hitherto published larger operative statistics, is confirmed by my report. In addition it shows, furthermore, the gratifying fact, that in six cases this improvement kept on augmenting within the next few years. Since this leads to very interesting consequences which I shall, however, not now

discuss, as I do not want to go beyond the field of real facts, I briefly repeat here the data for a better survey.

The visual acuity rose after the operations from 0.1 to 0.25 and no further; from 0.1 to 0.15 and later on to 0.3; from 0.5 no further; from 0.08 to 0.1 and no further; from 0.1 to 0.3 and later on to 0.5; from 0.1 to 0.5 and later on to 0.8; from 0.2 to 0.25 and later on to 0.3; from 0.25 to 0.3, later interfered with by secondary cataract; from 0.25 to 0.3 and later on to 0.4; from 0.1 to 0.25 and later on to 0.3.

A second fact resulting from my observations, which is little astonishing, however, is that in six of the ten cases a secondary cataract developed, although when the healing had completely taken place, the pupil had been absolutely clear and neither with a magnifying glass nor with focal illumination could the capsule be seen. The secondary cataract developed one-fourth, one and one fourth, two, two and one-fourth, two and three-fourths, and four years after the healing was finished. The secondary cataract always consisted of the well-known fine membrane which is so easily overlooked without focal illumination, shows numerous little folds and here and there thicker portions, and which in consequence refracts the light very irregularly; the same which, as a rule, sooner or later develops after cataract operations on juvenile patients, probably due to the stronger energy of growth residing in a juvenile lens.

In the five cases operated on in the last two years I have seen two more secondary cataracts from one and one and one-fourth year later and have operated for secondary cataract on two cases which had been operated by colleagues elsewhere. Thus I have found ten secondary cataracts in seventeen operations for myopia. This fact merits particular stress, since most of those operated on for myopia are juvenile individuals.

The dissection in most of my cases was very simple and followed by success without irritation, interrupting the occupation of the patient for twenty-four hours only. I perform it after the manner of Pagenstecher and Kuhnt through the sclerotic using either a very thin Luer's needle or a very practical little knife with which I became acquainted last year at Koenigsberg.

Proceeding now to an answer to the question of a further progress of the myopia after the operation, I want first to make a few remarks on the manner of my determination of the refraction.

The myopia was always determined by the correcting glass for the atropinized eye, the distance of the glass from the eye being 10 mm. The refraction of the aphakic eye was determined only after perfect healing had taken place and when the pupil was absolutely black. The distance of this glass from the eye was usually 13 mm. In order to avoid as far as possible all errors, the aphakia was repeatedly tested on different days and only perfectly certain results were noted down. Twice the same visual acuity was objectively obtained with different convex glasses, this difference reaching 1.5 D. Without paying attention to the glass which the patient preferred subjectively, the weakest convex glass was noted down.

Since all measurements were made with constant illumination and in a uniform manner, and since all of my patients possessed the intelligence necessary for a satisfactory test of their refraction, I can see no reason to doubt my statements as being the exact expression of the refraction as really existing.

In two cases only, that of Case III, a laborer, aged 24 years, with 12 D., and that of Case IV, a lady, aged 37 years, with 16 D., did I find the same optic conditions three and a half years after the operation, which had existed when the healing was completed.

In the remaining eight cases I found later on a change in the correcting glass, and there was never an increase, but always a decrease. The results, put side by side, are here repeated.

There was a decrease of hyperopia: In the lady, 17 years of age, with 20 D. after four years of 0.5 D.; the boy $3\frac{1}{2}$ years of age, with 14 D. after three and a half years of 1.5 D.; the girl, 16 years of age, with 18 D. after three years of 1.5 D.; the lady, 18 years of age, with 10 D. after three years of 1 D.; the boy, 14 years of age, with 12 D. after two and three-fourths years of 2 D.; the boy, 8 years of age, with 10 D. after two and three-fourths years of 2 D.; the laborer, 31 years of age, with 14 D. after two and a half years of 1 D.; the boy, 10 years of age, with 12 D. after two years of 1.5 D.

As there are three cases among the ten in which the second eye has up to date not been operated on, it will be interesting to compare the refraction of the unoperated with that of the operated eye.

In Case III the operated eye showed no decrease of re-

fraction after three and a half years; in the unoperated eye the refraction rose from 10 D. with $\frac{1}{3}$ visual acuity to 12 D.

In Case VIII the refraction of the operated eye decreased in two and three-fourths years 2 D.; the unoperated eye changed from — 8 D. \bigcirc — 2 D. cyl to — 11 D. \bigcirc — 2 D. cyl. with $\frac{1}{4}$ visual acuity.

In Case IX the refraction of the operated eye decreased in two and one fourth years 1 D.; in the unoperated eye the myopia rose from 12 to 14 D. with $\frac{1}{2}$ visual acuity.

The remaining cases were operated on both eyes and offer no such chance of comparison.

Reviewing the whole ten cases from this standpoint, we find that only in one-fifth of the cases the refraction remained the same as it was at the time of the operation, in four-fifths a further decrease of the hyperopia took place in spite of the operation.

My small series can, of course, not be used for generalization, since chance plays too great a rôle in such a small number of cases. Yet, the knowledge of this fact is surely interesting. At all events, I do not know how to explain my figures, if not by the increase of the axial myopia in spite of the operation by further elongation of the eyeball. By further considering that the decrease of the convex glass of the aphakic eye by 1 D. means an increase of the myopia in the unoperated eye of 2 D., I am forced to the unexpected conclusion, that during an observation of from two to four years the operation had exerted no influence upon the increase in elongation of the eyeball in four-fifths of my cases.

This does not, of course, mean that in the future, through the much more favorable conditions for work in which these operated myopic eyes now are, a decided beneficial influence may not assert itself; for we can not expect that the inflammatory processes which cause the ectasia of the posterior pole of the eyeball should at once cease after the operation.

A moderate decrease of the refraction, however, would in most cases be beneficial, as it would render the refraction more nearly emmetropic, and emmetropia seems to result in but few cases.

Yet, even if the process of myopia should still keep on progressing in spite of the operation in a number of cases, this would not militate against the operation; on the contrary, it

would be the more indicated, as it would render the patient much better able to work than he should be without it, at least if the operation in no way injures the eye. This, however, is the most important point.

I do not think here of the danger of infection, although a number of eyes will certainly be lost by it, as we have no absolute guard against it; neither of an increase in the intra-ocular pressure and retinal hæmorrhages with their deleterious consequences, but of the danger of detachment of the retina which already has ruined an ominously large number after the operation and recently has influenced Schreiber to make his excellent communication on the indications of the myopia operation. It is impossible to be too careful of the vitreous body in our operations. Hirschberg accuses not only prolapse of vitreous body but also, especially, the too frequent discissions which penetrate into the vitreous body, of causing the consequent detachment of the retina and I think, that after a careful consideration of everything for and against this view we can hardly gainsay it. Above all, no discission must reach through the whole lens and the posterior capsule; neither must, at the extraction of the lens, the attempts to remove all easily reached particles of lens-substance be too persistent. These results must guide us in order to avoid injuring the vitreous body. In my fifteen cases I did not have any prolapse of vitreous body. Under no circumstances must we try to hasten the sometimes slow process at the expense of security, and it is questionable whether some recent recommendations made in order to change the technique of the operation, can be looked upon as a progressive.

It can readily be understood and is simply human, than an operator, who has seen retinal detachment follow, and especially when such accidents repeat themselves and his operative material is perhaps small, should lose his enthusiasm for the operation and inveigh against it by mouth and literature and that he, as little as his patients, should consider Fukala's operation a brilliant addition to modern eye-surgery. Yet, at present, we may still ask whether such a misfortune might not have been avoided, with a better operative technique, or if the indications had been studied more precisely.

He, who in his operations is guided not by the number of dioptrics, but especially by the inability to earn a decent liv-

ing, the employment and the age of the patient, will be better able to bear an eventual misadventure following his operation.

The same degree of myopia which renders many a laborer breadless and makes him a useless member of human society, may under the same circumstances not even inconvenience a scientist. In a boy, aged 8 years, a much smaller number of dioptrics may be an indication for operation, than in the adult in whom an operation with less than 1 D. needs a special justification. Juvenile individuals who in sharp competition have to struggle for a living, furnish other points for consideration than patients of riper years who can complacently look back upon their successes.

And, further, we all know that there are exceptional cases in which the continued wearing of even the strongest concave glasses (I have seen two patients, each with only one eye, who seemed to wear — 20 D. for a long time without discomfort) is well borne by the eyes, without causing any inconvenience to the wearer.

He, who has seen the enormously increased faculty for work and the often astonishingly increased happiness in their existence of some operated myopes, can not get rid of the thought, that Fukala's operations must lastingly maintain its blissful existence. However, it is our duty to ascertain without a doubt the best technique and the correct indications.— (*Zehender's Monatsblätter*).

EDITORIAL NOTES.

A new journal on Ophthalmology is about to be published by S. Karger, Berlin, the editorship of which lies in the experienced hands of Professor Kuhnt (Koenigsberg), and von Michel (Wuerzburg). The prospectus contemplates original articles, clinical cases, half-yearly reports on the foreign literature, therapeutic progress and reports of societies. The list of collaborators contains twenty-three well-known gentlemen and we have no doubt this new journal has a bright future before it.

A second edition of Graefe and Saemisch's Cyclopædia is at present being published by W. Engelmann, Leipzig. The first three fascicles by Alfred Graefe have just appeared.

CORRESPONDENCE.

INVITATION TO THE NINTH INTERNATIONAL CONGRESS OF OPHTHALMOLOGY, TO BE HELD AT UTRECHT, NETHERLANDS, AUGUST 14 TO 18, 1899.

SIR AND HONORED COLLEAGUE—In accordance with the resolution adopted by the Eighth International Congress of Ophthalmology held in Edinburgh in 1894, the undersigned have constituted themselves a committee of organization and have the honor to invite you to take part in the Ninth International Congress of Ophthalmology, which will meet in Utrecht, Monday, August 14, 1899.

The only languages in which communications and discussions may take place are English, French or German.

In the morning there will be general sessions or meetings by sections; these latter are arranged according to the subjects which will occupy them especially. There will be:

A—Section of Anatomy, Pathological Anatomy and Bacteriology.

B—Section of Optics and Physiology.

C—Section of Clinical and Operative Methods.

In each section the language to be used for the communications will be decided upon, without, however, excluding absolutely the other two.

For secretaries we can count on the efficient assistance of Dr. A. McGillivray, of Dundee, for the English; Dr. August Dufour, of Lausanne, for the French; Dr. A. Siegrist, of Basel, for the German language.

The amount to be paid by each for the defraying of the general expenses and the transactions has been set at 25 francs (\$5.00).

The reception committee is composed of the following gentlemen:

MR. B. REIGER, Mayor of Utrecht,

DR. jur. J. BARON, d'Aulnaix de Bourouill,

DR. jur. J. C. N. VAN EYSE VAN LIENDEN,

DR. A. A. V. HUBRECHT, Professor at the University,
DR. jur. J. E. HUYDECOPER, de Maarseween and de Nigtevecht,
DR. H. SNELLEN, Professor at the University.

In order to be able to take the necessary measures in time, we beg you to announce as soon as possible to the last of the undersigned whether we can count on your participation in the Congress and whether you will be accompanied by your ladies, etc. * * *

We beg of you also to let us know which language you should prefer to use in the discussions. Members, who intend to make a communication are asked to give us the title at once. * * *

Utrecht, December, 1898.

D. ARGYLE ROBERTSON, President Eighth Int'nl Congress,
G. A. BERRY, Secretary Eighth Intn'l Congress,
M. E. MULDER, Professor University of Groningen,
M. STRAUB, Professor University of Amsterdam,
W. KOSTER, Professor University of Leyden,
H. SNELLEN, Professor University of Utrecht.

PAMPHLETS RECEIVED.

- "Artistic Breathing," by G. H. Makuen, M.D.
- "Remarks on Hydrophthalmos," by J. M. Ball, M.D.
- "A Case of Quinine Amaurosis," by J. M. Ball, M.D.
- "Antisepsis and Antiseptics," by Ch. M. Buchanan, M.D.
- "Foreign Bodies in the Lens," by B. Wicherkiewicz, M.D.
- "Experiences with Protargol," by B. Wicherkiewicz, M.D.
- "Congenital Absence of the Iris," by J. A. Andrews, M.D.
- "Diseases of the Ear as a Specialty," by E. Amberg, M.D.
- "Recurrent Parotitis in a Healthy Child," by F. C. Ewing, M.D.
- "Xeroform in Ocular Therapeutics," by B. Wicherkiewicz, M.D.
- "The Climates and Health Resorts of Canada," by P. H. Bryce, M.D.

MEDICAL SOCIETIES.

FOURTH ANNUAL MEETING OF THE WESTERN OPHTHALMOLOGICAL AND OTOLARYNGOLOGICAL ASSOCIATION.

CARNIVAL MEETING.

The fourth annual meeting of the Western Ophthalmological and Oto-Laryngological Association will be held in New Orleans, La., February 10 and 11, 1899, these dates having been selected in order to give the visiting members an opportunity to see New Orleans during the celebrated Mardi Gras Carnival. Reduced rates will be issued by the railroads for this occasion, return ticket from Chicago about \$25.00, from St. Louis about \$20.00, and from other localities in proportion.

SCIENTIFIC PROGRAM.

An interesting program is being prepared and will be mailed in due time by the secretary. A full attendance is confidently expected. Prominent men have been invited to deliver the opening address to the Ophthalmological and Oto-Laryngological Sections. The meeting will be held in the New Orleans Polyclinic Building.

ENTERTAINMENTS.

On Friday, February 10, the members are invited to a reception given by Dr. and Mrs. Scheppegrell, and on Saturday evening a number of boxes will be retained at the French Opera House for the members and the ladies who accompany them. On Monday and Tuesday the Carnival processions will be seen. Convenient places for observing these will be furnished by the Arrangement Committee. The Rex Carnival ball will take place Tuesday evening, invitations for which may be obtained by members applying to Dr. Scheppegrell, Chairman of the Arrangement Committee, New Orleans. The Arrangement Committee will also provide members with cards for the various clubs of New Orleans.

HOTEL ACCOMMODATIONS.

The hotels of New Orleans are as follows:

ST. CHARLES HOTEL (American plan)—\$5.00 per day, payable from date of engagement.

HOTEL GRUNEWALD, European plan, \$1.50 to \$2.50; American plan, \$3.50 to \$4.00 per day.

HOTEL ROYAL, \$2.50 to \$4.00 per day.

THE COSMOPOLITAN, European plan, \$1.50 and upwards per day.

HOTEL DENECHAUD, American plan, \$2.50 and upwards per day.

Members are requested to address the above directly for reservation during the Carnival. In addition to the hotels there are furnished rooms in various parts of the city, a partial list of which will be supplied by the Arrangement Committee.

Owing to the demand for hotel accommodation, two special Pullman cars will probably be retained for the whole visit. Members are requested to communicate with Dr. Thomas A. Woodruff, 1102 Reliance Building, Chicago, Ill., for rates and reservation.

Members who will be present at the meeting will please notify Dr. Scheppegrell, Chairman, as soon as convenient, in order to facilitate the work of the Arrangement Committee. Titles of original communications for the meeting, and application for membership, should be sent to Thomas A. Woodruff, 1102 Reliance Building, Chicago, Ill.

OFFICERS.

President, Dr. E. J. Colburn; First Vice-President, Dr. W. Scheppegrell; Second Vice-President, Dr. Casey A. Wood. Third Vice-President, Dr. H. Gifford; Secretary, Dr. Thomas A. Woodruff; Treasurer, Dr. W. L. Dayton.

COMMITTEES.

Program—Dr. F. M. Rumbold, Chairman; Dr. H. V. Würdemann, Dr. H. Fifford.

Publication—Dr. A. Alt, Chairman; Dr. Thos. A. Woodruff, Dr. M. A. Goldstein.

Admissions—Dr. G. Knapp, Chairman; Dr. Casey A. Wood, Dr. E. C. Ellett.

Arrangement—Dr. W. Scheppegrell, Chairman; Dr. Isadore

Dyer, Dr. Otto Joachim, Dr. Augustus McShane, Dr. Paul Reis, Dr. Chas. Chassaignac, Dr. Jno. Callan.

Reception—Dr. Chas. Chassaignac, Chairman; Dr. J. D. Bloom, Dr. E. T. Shepard, Dr. Rudolph Matas, Dr. F. Loeber, Dr. W. Brickel, Dr. Frederick Parham, Dr. Q. Kohnke, Dr. F. Formento.

MEMBERSHIP.

The membership of this Association shall be limited to members of the regular profession, of acknowledged reputation, who shall have engaged in the practice of diseases of the eye, ear, nose and throat for at least three years. All applicants must be eligible for membership in the American Medical Association, and all applications must be endorsed by at least three members of this Association who are in good standing.

PRELIMINARY PROGRAM.

OPHTHALMOLOGICAL SECTION.

DR. G. T. STEVENS, of New York, will give the address before the Section on Ophthalmology.

W. A. FISHER, Chicago—(Title not given).

W. H. BAKER, Lynchburg, Va.—Retinoscopy.

J. ELLIS JENNINGS, St. Louis—(Title not given).

A. ALT, St. Louis—The Pathology of Cataract.

J. R. ROBINSON, Colorado Springs—(Title not given).

S. S. LEDBETTER, Birmingham, Ala.—Keratitis Herpetica.

H. H. BROWN, Chicago—The Etiology and Importance of Iritis.

W. E. DRIVER, Norfolk, Va.—Best Vision After Cataract Extraction.

E. E. HAMILTON, Wichita, Kans.—Refraction of Trachomatous Eyes.

R. F. LEMOND, Denver, Colo.—Ulcerative Keratitis and How to Cure It.

H. I. McMORTON, Minneapolis, Minn.—A Study of Conjunctival Ulceration.

J. J. KYLE, Marion, Ind.—An Ophthalmologist's Experience with the Army.

ELLET O. SISSON, Keokuk, Iowa—Injuries of the Eyeball, with Report of Cases.

HAMILTON STILLSON, Seattle, Wash.—Some Experiments With the Giant Magnet.

A. R. AMOS, Des Moines, Iowa.—Luxation of Both Lenses Giving Rise to Glaucoma.

G. A. WALL, Albuquerque, N. M.—Retinal Detachment, Loss of Vision, Recovery.

K. K. WHELOCK, Fort Wayne, Ind.—Congenital Arrest of Development of the Cornea.

CASSIUS D. WESCOTT, Chicago—Some Experiences With Dr. Gould's Method of Prismatic Exercises.

B. E. FRYER, Kansas City, Mo.—Profuse Hæmorrhage Subsequent to Extraction of Senile Cataract.

E. C. ELLET, Memphis, Tenn.—Series of Cases of Malarial Keratitis With Reports of blood examinations.

CASEY A. WOOD, Chicago—Glioma of the Medulla, With Report of Autopsy and Microscopical Examinations.

J. A. MULLEN, Houston, Texas—The Percentage of Color-Blindness to Normal Color-Vision as Computed from 308,910 Cases.

L. R. CULBERTSON, Zanesville, Ohio—Case of Bell's Palsy and Epilepsy Cured by Correction of Ametropia and Heterophoria.

GEORGE F. KEIPER, Lafayette, Ind.—Treatment of Diseases of the Lachrymal Duct by Cataphoresis with Exhibition of Cupped Sounds.

H. V. WUERDEMANN, Milwaukee—A Report on Operative Treatment of High Myopia. Discussion by CASEY A. WOOD, of Chicago, and B. E. FRYER, of Kansas City, Mo.

DUDLEY S. REYNOLDS, Louisville, Ky.—Treatment of Acute and Chronic Glaucoma. Discussion by JOHN F. FULTON, of St. Paul, and CHARLES W. KOLLOCK, of Charleston, S. C.

JAMES M. BALL, St. Louis—Large Tumor of the Brain Encroaching on the Motor Area and Causing Few Symptoms Save Optic Neuritis, With Remarks on the Value of Double Neuritis as a Sign of Brain Tumor.

PROCEEDINGS OF THE OPHTHALMOLOGICAL
SOCIETY OF THE UNITED KINGDOM.

H. R. SWANZY, F.R.C.S.I., President, in the Chair.

CLINICAL EVENING.

THURSDAY, DECEMBER 8, 1898.

RENAL RETINITIS.

MR. NENTLESHIP showed a microscopical drawing. Pigmentation of the retina was known to occur in cases of renal retinitis where the disease was either severe or of long standing; it was generally seen near the periphery, but if the case lasted long enough it was found near the disc. The case from which the drawing had been taken had been observed during life, and the pigmentation had been noted. After death the eyes had been examined. A number of oval or round cells, with amorphous *débris*, the remains of an inflammatory exudation, were found in the retina between the bacillary layer and the hexagonal pigment layer in different places; these foci contained pigmented cells derived from the pigment epithelium, probably by proliferation.

SYMPATHETIC OPHTHALMIA BEGINNING FOURTEEN DAYS
AFTER EXCISION OF THE INJURED EYE.

MR. HOMES SPENCER showed a boy, aged 10 years, who was struck in the left eye on July 4 by a piece of sardine tin; there was a jagged wound of the cornea not involving the ciliary region; the anterior chamber was filled with blood, and the deeper parts could not be seen. A week later a piece of entangled iris was removed from the wound by iridectomy; the lens was found to be wounded. The eye remained painful and much congested and iritis set in, and it was excised on July 25, three weeks after the injury. The patient remained in hospital until August 6. Two days later there was slight ciliary injection of the right eye, fourteen days after excision. He was taken into hospital again: T. was — 2, V. = $\frac{7}{XXVI}$; the pupil was well dilated; there was no deposit on the back of

the cornea; there was much floating matter in the anterior part of the vitreous; there was no optic neuritis. He was treated with atropine and mercurial inunction. The tension had now become normal, and the vision was $\frac{6}{18}$.

AN UNUSUAL FORM OF MARGINAL KERATITIS.

MR. JOHN GRIFFITH and DR. BLAIR showed a case. The condition had existed for several years, and was associated with eczema of the face; the keratitis was symmetrical, attacking the inner and outer margins of each cornea close to the limbus. The lesions were slightly raised, vascular, and in three out of four limited by a curved line of opacity. It bore some resemblance to phlyctenular keratitis, but its persistence, absence of ulceration, and want of symptoms excluded this disease. It resembled spring catarrh, but the palpebral conjunctivæ were quite healthy.

PULSATING EXOPHTHALMOS WITH VISIBLE TUMOR.

MR. W. J. CANT showed a man, aged 36 years, who was kicked on outer part of the left eyebrow eight years ago. Eighteen months ago he had pain over the right eyebrow with vomiting; the sight became dim, and he had diplopia. Gradually a swelling appeared at the upper inner angle of the right orbit, and he was conscious of a loud whistling sound in the head; as the swelling increased the sight returned and the diplopia ceased. R. E. V. = $\frac{6}{VI}$ J. 1, proptosed 8 mm. There were large tortuous veins on the ocular conjunctiva, a pulsating movable tumor diminished by pressure on the carotid; a loud *bruit* could be heard over the region of the tumor. There was no diplopia; the pupil acted normally; the retinal veins were enlarged, tortuous, and pulsating. He had been treated with rest, low diet, iodide of potassium, and digital compression with considerable benefit.

SYMMETRICAL CHOROIDITIS IN THE EARLY STAGE.

MR. HARTRIDGE showed a man, aged 23 years, who first had dimness of sight five months ago; the sight had been progressively failing since. Family history good; personal health good; no history of syphilis. V., R. = $\frac{6}{XXVI}$, L. = $\frac{6}{XII}$. Both optic discs swollen and blurred; a large choroidal hæmorrhage

on the outer side of each disc, œdema of the retina over the whole central region, with a number of small circular exudations in the superficial layers of the choroid; urine normal.

ATROPHY OF THE CHOROID WITH SCLEROSIS OF THE CHOROIDAL VESSELS.

MR. ERNEST CLARKE showed a man, aged 53 years, who first attended the City of London Ophthalmic Hospital four years ago with the history that his sight had been gradually failing for a year. He had been a heavy drinker and had syphilis. He had well-marked optic neuritis in both eyes, and vision was reduced to figures at a meter in both eyes; there was no history of night-blindness. The following changes had been gradually coming on since then, and the present condition of the eye was: Atrophy of the optic nerve and retina, atrophy of the epithelial pigment and of the chorio-capillaris, which allowed the vessels in the tunica vasculosa to be well seen; sclerosis of many of the choroidal vessels, especially on the temporal side of the posterior pole of each eye. The periphery of the retina showed pigmentation like that of retinitis pigmentosa. Large flocculent vitreous opacities. Vision reduced to p.l.

MYXOSARCOMA OF THE ORBIT.

MR. JULER showed a female, aged 20 years, who first had diplopia in May, 1897; in February, 1898, the left upper lid began to droop and the eyeball was turned downwards and proptosed; the displacement of the eye increased until June 15, when there was marked ptosis and proptosis, the movements of the globe being limited. The tumor was soft and fluctuating, but contained two hard nodules. The skin of the face sprinkled with brown and blue pigment spots which had always been present. On June 25 the contents of the orbit were evacuated after puncture by a trocar and canula had given exit to several drachms of clear gelatinous fluid which came from a cyst in the growth. After removal the bone of the roof of the orbit was found eroded, and an aperture led to the dura mater. Last month there was a recurrence beneath the upper lid. Microscopically the tumor presented the appearances of a myxoma, but the invasion of the frontal bone

and the recurrence indicated that it was probably sarcomatous. It consisted of stellate branching cells, round cells, and blood vessels; within the meshes of the tissue was a large amount of mucin.

CONGENITAL ABSENCE OF CHOROID.

DR. TATHAM THOMPSON showed a man, aged 18 years, with V.=²⁰/_{cc}, a dazzling white sclera being seen all over the fundus except at the macula; there were a few isolated choroidal vessels only.

TUMOR OF IRIS.

MR. A. H. THOMPSON showed a small tumor, probably a sarcoma, projecting from the anterior surface of the iris.

INJURY TO CORNEA.

MR. W. H. JESSOP showed a case. A large flap turned back from the upper margin of the cornea had become reapplied and united.—(*British Medical Journal*).

BOOK REVEIWS.

A TREATISE ON UNRIPE CATARACT. By W. A. McKEOWN, M.D., M.Ch. Illustrated by nine plates containing sixty original drawings. 1898. Price, 12/6d. London: H. K. Lewis, Publisher, 136 Gower St., W. C.

The author, who in 1884 introduced irrigation of the anterior chamber for the removal of lens substance in cataract extraction, gives in this voluminous book his large experience with this method as especially adapted to the removal of "unripe" cataracts. He confines himself to the report of his own work on which he is surely to be congratulated. Among his conclusions we may mention that irrigation is more efficient in removing cortex than any other method; that it restores tone to a collapsed cornea and supplies the want of aqueous humor; that in incomplete cortical cataract the zonule of Zinn being usually strong the conditions are particularly favorable for safe irrigation; that secondary operations form a small percentage.

Finally, he advocates iridectomy in cataract extraction. The book is worthy of a careful study. Print and illustrations are of the best.

LA VISION—ETUDE PHYSIOLOGIQUE. (VISION—A PHYSIOLOGICAL STUDY). By H. PARINAUD, M.D. Illustrated. 1898. Price, 6 francs. Paris: Octave Doin, 8 Place de l'Odéon.

This is an exceedingly interesting and important work in which the author develops a new explanation of the phenomena of vision by the known anatomical facts, the clinical observation and the theory of evolution. He does not hesitate to state that the philosophical, psychological and mathematical methods of explanation have not done much more than envelop the whole question of vision in an impenetrable mist. The book aims at, and we think the author has succeeded to a marked degree, a more simple and physiological explanation of all the phenomena of vision. It is most interesting reading and should be studied by all. Print and make-up are excellent.

THE CRYSTALLINE LENS SYSTEM. ITS EMBRYOLOGY, ANATOMY, PHYSIOLOGICAL CHEMISTRY, PHYSIOLOGY, PATHOLOGY, DISEASES, TREATMENT, OPERATIONS, AND AFTER-CHANGES, With a Consideration of Aphakia. By LOUIS STRICKER, M.D. Cincinnati, Ohio. 1899. Sold by subscription at \$5.00.

The book, dedicated to the memory of Otto Becker, is a translation of Becker's part in Graefe and Saemisch's Cyclopædia enlarged up to the times. It gives an elaborate and extensive exposé on all that is known at present concerning the lens. The author has added to the bibliography given by Becker enough of that of more recent years to make the bibliography take up no less than 166 pages and yet it can hardly be called complete. It is a pity the book is so full of misprints, in the future edition the author should take care to remove them. The book is of special interest to those unable to read Becker's original volume, or the one in the second edition of Graefe and Saemisch just now appearing in print. ALT.

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ORIGINAL ARTICLES.

PROFUSE HÆMORRHAGE SUBSEQUENT TO THE
EXTRACTION OF SENILE CATARACT.¹

BY B. E. FRYER, M.D., KANSAS CITY, MO.

PROBABLY there is nothing which can happen to the ophthalmic surgeon more appalling than profuse hæmorrhage following the extraction of senile cataract. There are no indications, no premonitions which enable us to prognose that this or that case will or will not be free from this dreadful disaster. We must theorize, I believe, if we consider the hydraulic factors plus the defective and diseased intra-ocular blood vessels almost always existent with senile cataract, that hæmorrhage may occur in any case. It has been my experience to meet with three instances in which abundant hæmorrhage occurred after very smooth extraction; two of these were published, and they are referred to among forty-eight others in Spalding's admirable paper on the subject in *Knapp's Archives of Ophthalmology*, Vol. XXV, No 1.

In this paper I propose to report a third case and to comment upon it and upon some of the views held by those who have been so unfortunate as to have this terrible result occur in their practice.

Mrs. S., aged 74 years, American, consulted me in July,

¹Read at the Fourth Annual Meeting of the Western Ophthalmological and Oto-Laryngological Association, held at New Orleans, La., February 10-11, 1899.

1897, in regard to her right eye. I found she had incipient cataract, and that the tension was $+1$. Vision sufficient to enable her to get about with caution. Visual field good. The left eye was simply a stump, sight in it had been suddenly lost about two years previously. Any attempt to ascertain the exact cause of the destruction of the left eye was not either very satisfactory or successful. All that I could discover was that the vision failed suddenly preceded by great pain and afterwards the globe shrunk to about half the normal size. My opinion is that there had been hemorrhagic glaucoma. As to general health all inquiry for any defects failed. No rheumatism, no gout, no specific complication; and the general appearance was that of good health and fair nutrition.

I at once began the instillations of pilocarpine for the right eye, and in a few days did an iridectomy upwards. These measures brought tension down and the case was kept under observation a year. In the meantime the cataract reached maturity and the operation was done. The eye was carefully prepared antiseptically with protargol for several days, cocaine anæsthesia was had, and the patient placed in Knapp's operating chair. The incision, which was wholly within the cornea, was made very smoothly, included a little more than two-fifths of that membrane. The patient was perfectly quiescent. No pressure was made upon the eyeball or lids, the latter being held apart by lid-retractors in the hands of my most skillful assistant, Dr. J. S. Lichtenberg. The lens was delivered very easily after a T-shaped capsulotomy. There was no collapse of the cornea; the edges of the incision were coaptated perfectly; the iris was in no way interfered with, and no portion of it became engaged in the wound. No vitreous was lost. The operation, which did not last longer than forty seconds, was finished at 11:45 A.M., and the eye carefully dressed, and absolute quiet enjoined. Previous to the operation I informed the patient's daughter that hæmorrhage was possible. Four hours after the operation, viz., at 4 P.M., I was hurriedly sent for, and on reaching the patient, found blood streaming down the face under the dressings, which latter were thoroughly saturated. The dressings were removed, the face and lid carefully cleansed with carbolic acid solution and sublimate gauze reappplied. Slight oozing continued, however, for eight or ten hours afterwards. The blood, I was informed by the patient's

daughter, had appeared very suddenly and in quantity. No vascular tissue was cut in the operation, and there was not the slightest stain of blood when the original dressings were put in place; this dressing consisted of six thicknesses of sublimate gauze held in place by strips of isinglass plaster. The case was closely watched by me for more than an hour after the first dressing was applied and no bleeding occurred, and the patient's daughter is very positive that the hæmorrhage did not take place until four hours after the operation was over, and when it appeared, it was with a gush and it continued as above mentioned. The eye became a stump but enucleation was not done.

Reflecting on this case, it seems that the unfortunate result was unavoidable. Every precaution was had to prevent it. The operation was perfectly smooth and regular in every respect. No pressure or traction was made upon the eyeball by any of the instruments. The most thorough quiet was enjoined upon the patient. I watched the case closely for an hour after the extraction and for three hours after that there was no bleeding. No drug was given having for its object prevention of the hæmorrhage, believing as I do that any remedy heretofore suggested, is futile. Possibly a thoroughly and long quieting dose of morphia might have been tried, but the nauseating and vomiting effect of this might have produced the result which it was so desirable to avoid.

Spalding's paper, in *Knapp's Archives of Ophthalmology*, which I have alluded to, reports a hæmorrhage after cataract extraction, and gives the bibliography of fifty others. Spalding says: "This accident is supposed to be extremely rare, and many ophthalmic surgeons with whom I have conversed, had never heard of but one or two cases of the sort, and they expressed surprise when I mentioned that I had discovered as many as fifty reported cases, whilst of the unreported (owing to a sense of shame perhaps) there must be a much larger number than we have at present any idea."

Spalding comments on his own case and gives in more or less detail an abstract of a "few of the most important cases reported especially of those in which the authors express some opinion in regard to the etiology of the accident, or concerning some means for prevention."

I shall quote from Spalding's paper extensively with ref-

erence to the opinions of the writers which he embodies in his essay. And I desire here to give him full credit for his valuable presentation of these, exhibiting as they do the views of many of the prominent ophthalmologists throughout the world on this important but neglected subject.

With reference to his own case Spalding states, that he believes the hæmorrhage is due to the relaxation of the suspensory ligament permitting the too rapid extraction of the lens, as a result of which the degenerated vessels in the region of the incision give way. While this may explain somewhat bleeding which immediately follows the extraction, it scarcely does so where the bleeding is delayed until several hours afterwards. In this latter condition it is more probable that fluctuations of pressure made by the lids upon the eyeball produce a partial emptying of the anterior chamber from time to time, with the result of diminished and varied support of the vascular walls with finally a rupture of one or more of the vessels. While in the former, where the bleeding occurs as really a part of the operation the one diminution of supporting pressure is sufficient to cause the break.

Hirschberg (*Centralblt. f. Augenheilk.*, 1890, p. 538), who reviews Wood's paper in the *New York Medical Record*, May, 1890, asks, when glaucoma complicates senile cataract, whether we shall first iridectomize and then extract, or to perform both operations at the same sitting. Hirschberg adds, prophylaxis is useless, as there are no premonitory symptoms. (Spalding). This corresponds with my own views.

Fage (*Arch. d'Ophth.*, August, 1889) reports a case where the microscopic examination demonstrated that the hæmorrhage came from between the choroid and sclera. Fage adds, that if he had to extract from one eye where its fellow had been lost from hæmorrhage, he would use ergotine treatment preliminary to the extraction, and insist upon perfect quiescence of the patient after operation. (Spalding).

I would emphasize here, in reference to this suggestion as to the use of ergotine which is made by Fage and others, both in this country and in Europe, that the remedy would add to, rather than diminish, the risk of hæmorrhage; for those who recommend ergotine lose sight of the fact, that while the drug will produce as the essential effect diminution of vessel-calibre, it follows with this, that there will also be a correspond-

ing increase in systemic arterial pressure, which effect being the one we should seek to avoid, not only as regards the ocular vessels, but those of the brain. With increased arterial tension, even though we have diminished vessel-calibre, it can be readily seen that the risk of rupture of the vascular walls is the greater. In 1884, at the French Society of Oculists, this subject being under discussion, ergotine was also suggested as a prophylactic.

De Schweinitz (*Annals of Ophthalmology and Otology*, III, p. 12) reports a case with but one useful eye. De Schweinitz properly took the precaution to do a preliminary iridectomy. A month afterwards, on completion of the corneal incision, a bead of vitreous appeared and the lens was immediately removed with the spoon. After the bandage was applied the patient complained of severe pain in the eye, and of nausea. Anticipating hæmorrhage, a hypodermatic injection of morphia was given, and the patient placed in a sitting position, but hæmorrhage came and the eye collapsed. (Spalding).

Galezowsky has stated that he had had but one hæmorrhage in over 1900 simple extractions, and believes that rarity of the bleeding in his cases is due to the fact that in simple extraction atheromatous vessels in the vicinity of the iris are not opened. This assertion, however, is void, because in the case of de Schweinitz and in my last case a preliminary iridectomy was done sometime prior to the extraction.

Moreover, Knapp, whose skill as an operator is so universally acknowledged, met with a case of his own, after simple extraction. Knapp is of the opinion that the bleeding came from the anterior portion of the choroid.

Fage examined an enucleated eye which was removed for hæmorrhage following extraction, and states that the blood came from the anterior portion of the choroid; both the retina and choroid were detached.

A number of other ophthalmologists have reported cases, while in a few of them the bleeding occurred a few hours after the operation, as in my case and in de Schweinitz's, in the majority of instances the blood appeared either during the operation or just after. The opinion of the majority of the reporters, as to the site of the vessels from whence the bleeding came, is that it was from the uveal tract—either the ciliary body or the choroid. A number of other writers might be

quoted, but as their views are in the main similar to those already given, they may be omitted. Some of the more prominent are Knapp, Gruening, Risley, Jackson and H. Derby in this country, and Mooren, Lebrun, Dufour, Darier, Simi and others abroad.

In summarizing I believe it correct to state:

1. That profuse hæmorrhage, after senile cataract extraction, is not so rare an occurrence as has been supposed; that it may follow the most smooth operation; that it can take place when the extraction is simple as readily as when the operation includes an iridectomy; that even with the precaution of a preliminary iridectomy the catastrophe may happen.

2. That while the bleeding may follow any cataract extraction, it is more likely to do so in cases in which glaucoma exists or has existed; that there are no means of prognosing as to its occurrence or absence in any case.

3. That there are no certain means known of preventing the hæmorrhage, and that the suggestion as to the use of ergotine for prophylaxis is erroneous and perhaps dangerous. If an opiate for prevention of the accident is used the patient should be kept narcotized more or less, until the healing of the incision is assured. But in that event a preliminary test should be made upon the patient as to the effect of the drug upon him so as to enable the operator to decide as to the safety of exhibiting the narcotic at the time of operating.

4. The maturity or immaturity of the cataract plays no part as to causation.

PAMPHLETS RECEIVED.

"The Sequelæ of Middle-Ear Suppuration," by E. B. Dench, M.D.

"On Traumatic Recurrent Corneal Neuralgia," by B. Wicherkiewicz, M.D.

"The Scientific Borderline Between Sanity and Insanity," by E. C. Runge, M.D.

"Diseases of the Alimentary Canal,—Treatment, Etc.," by J. O. DeCourcy, M.D.

ON THE PATHOLOGY OF CATARACT, ESPECIALLY
IN ITS EARLIEST STAGES.¹

BY ADOLF ALT, M.D., ST. LOUIS, MO.

[WITH MICRO-PHOTOGRAPHS.]

I N my text-book on "The Normal and Pathological Histology of the Human Eye," published in this country in 1880 under the title of "Lectures on the Human Eye," and in the chapter on "The Crystalline Lens," I stated it to be my opinion that "the pathological changes of the crystalline lens, when the capsule is intact, and which are called cataract, are simply regressive metamorphoses of the elements constituting the lens." To this standpoint my then comparatively limited studies seemed to force me. I had then never had occasion to see anything in lenses with an intact capsule like the hyperplasia and proliferation of the capsular epithelial cells as Iwanoff and Becker had described it under the term phakitis. And I may add right here, that even to this day it has not been my good fortune in the many cases of cataract which I have now examined, to see certain typical forms of phakitis as drawn and described by Becker. This discrepancy may, however, probably be explained by the difference in the material for examination which we each had at our disposal. The large vesicular cells as described by Wedl, Iwanoff and Becker I have in those days mistaken for drops and globules of myeline (liquor Morgagni) which, as I now know, was due to my insufficient staining methods which did not make their nucleus visible.

Becker took immediate occasion to criticise my whole description very severely, but surely only in part justly, as will be clear after my further statements.

Three years after my book he published his excellent, exhaustive and magnificently illustrated book on "The Crystalline Lens in Health and Disease." The study of which not

¹Read at the Fourth Annual Meeting of the Western Ophthalmological and Oto-Laryngological Association, held at New Orleans, La., February 10-11, 1899

only showed me wherein I had held an incorrect opinion, but also prompted me to examine all cataractous lenses within the intact capsule which I could obtain with especial care.

This material, and through it my experience, has now gradually grown far enough that I think it appropriate and just to myself to make it known to you and others interested in this subject, especially since I can not only add my testimony, as far as it goes, to Becker's statements, but think that I am in a position to fill some gaps in his description, particularly as concerns the earliest stages of cataract formation.

The discrepancies which still exist between our opinions, as I stated before, are probably in part accounted for by the fact, that Becker seems to have made his studies chiefly on ripe and over-ripe cataractous lenses which were furnished him by Pagenstecher and others whose method was to extract cataracts with their capsule. On the other hand, my studies since 1880 have chiefly been made on cataractous lenses in the earliest and earlier stages of the development of cataract as I found them in eyeballs removed on account of tumors in the orbit and neighborhood, or affecting the eyeball itself, on account of glaucoma, or cyclitic processes, and finally on eyeballs taken from dead subjects. Traumatic cataracts due to a ruptured lens-capsule are here not considered.

From Becker's severe criticism of my statement that cataract was a *regressive* metamorphosis, I had expected that his researches had taught him that cataract, on the contrary, must rather be considered as a *progressive, proliferating, so to speak inflammatory* process. I found, however, after all, that in his book he declared the beginning of the formation of a cataract to be due to the continued and excessive sclerosing process of the nucleus of the lens, but that, secondarily, this leads to the changes which Becker considers as active processes. In this fundamental point, then, our views were not as widely apart from each other as from his criticism it had appeared.

Permit me to recall to you here in a condensed form what Becker found in cataractous lenses.

The sclerosing process of the nucleus of the lens, which is a physiological retrogressive process, leads gradually to the formation of fissures between it and the cortex which may even sometimes be seen ophthalmoscopically. Gradually a more and more distinct separation between cortex and nucleus

may be observed. The outline of the yellow clear nucleus is sharply defined from the glass-like, clear cortex. Further on cloud- and point-like opacities appear in the cortex and increase in numbers. They may in rarer instances, also, be seen in the outermost layers of the nucleus. At this period the lens usually takes up fluid from without by imbibition and increases in volume. After a varying time this fluid is again given off and the lens resumes its normal volume. Diffuse and localized opacities in the nucleus Becker never saw, contrary to Foerster. Now abnormal chemical processes take place within the lens due to the stagnation of the imbibed fluid within the fissures separating the lens-fibers, whether these are preformed or due to the sclerosis of the nucleus. The fact, found by Priestley Smith, that cataractous lenses are of smaller volume than clear lenses of the same age, Becker lays great stress on, as a proof that the formation of fissures is due to an excessive sclerosis, an excessive *physiological retrogressive* metamorphosis of the lens.

The altered conditions of diffusion lead next to the formation of round- and drop-like bodies within the fissures, presenting in their aggregation the appearance of algæ or bamboo-joints and having a double contour. Becker calls them coagulated albumen and is not sure whether the coagulation took place *intra vitam* or is due to death or the influence of the hardening fluids in which the specimen was preserved. The description of these masses corresponds with the appearance of what is usually termed myeline (or liquor Morgagni) and represents the softer, semi-fluid contents of the lens-fibers. Then the neighboring fibers are changed into a condition of molecular opacity (fatty degeneration) and finally larger drop-lets are formed and the lens-fibers appear wrinkled. From the similar gradually progressing destruction of more and more fibers a grumous mass results which consists of detritus, globules of albumen (liquor Morgagni) and fat, and which sometimes contains granules of lime and crystals of cholesterine. This, according to Becker, is the way in which a senile cataract forms and progresses. The only juvenile cataract which he had occasion to examine was from a diabetic subject. The most characteristic change was a large quantity of a clear fluid of less refraction than the lens-fibers which at the æquator had penetrated, according to his opinion, through the capsule from

without. It filled numerous spaces between the lens-fibers. Gradually the lens-fibers swell and disintegrate in a similar manner as is the case in senile cataracts.

Thus far, you see, Becker speaks only of regressive changes, which evidently are sufficient to cause and lead to what we call a ripe cataract. This description does not differ much in essential points from what I had described. However, by far the larger part of the descriptive portion of Becker's book is devoted to the evidently secondary changes in the fibers of the

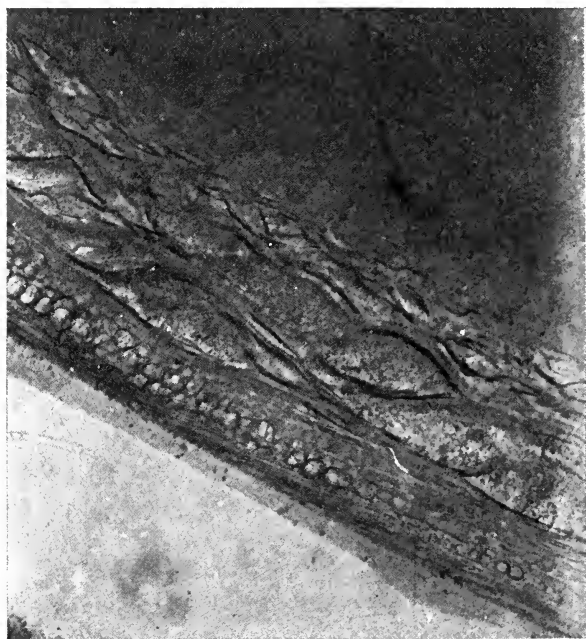


FIG. 1.

cortex, the capsular epithelial cells and the young lens-fibers at and near the æquator, which he partly considers as degenerative, partly as active processes. In the cataractous lenses which he examined these changes were nearly always present. They are undoubtedly well known to you, as their description can now be found in every text-book.

To the foregoing description of the formation of a cataract, from which in the main I see no reason to differ, I wish to add now the description of what further I have found in my researches.

In old lenses in which no formation of cataract was suspected I have frequently come across small spaces, lentil-shaped in meridional and round in æquatorial sections, and larger fissures lying between the lens-fibers usually concentrically arranged around the nucleus. These spaces and fissures are *intra vitam* probably filled with the nutritive fluids which pass through the lens. Sometimes such fissures take on an eccentric course and break through different fiber-layers. Further, there are always drops of myeline, especially in the sutures.

In some lenses I found no other changes, but a number of larger and smaller fissures near the æquator inside the posterior capsule. These were filled with a drop-like material, slightly granular, with a higher magnifying power. The picture it produced was very much like what Becker calls coagulated albumen in the shape of aigæ or bamboo-joints. I take this substance to be myeline and its occurrence in such a large quantity to be the first sign of the breaking down of the lens-fibers in which fluid imbibed from the outside through the capsule probably plays an important part. (Fig. 1).

From a larger number of lenses showing in addition what I consider to be the first signs of a beginning cataract, allow me to select a few for a more detailed description. I want to state first that of all these lenses I have the whole series of sections either in a meridional or æquatorial direction, and that what I have seen covers all the changes in such a lens which our present means could render visible.

In an eyeball, removed from an old lady on account of a carcinoma, a general haziness of the lens had been observed *intra vitam*.

I found the nucleus to be so large that the cortex at the anterior and posterior poles formed but a thin band. At the æquator the cortex was naturally thicker. The capsular epithelial cells were normal in appearance throughout and showed no irregularity in their arrangement in any of the sections.

Besides a number of concentric fissures at the æquator, there was in this region just inside of the nucleus a large irregular cleft, differing greatly in width and having an eccentric course, so as to pass through numerous fiber-layers. It contained a granular substance (fatty detritus?). (Fig. 2). Deep within the nucleus there were a number of broad lines, forming some concentric, some totally eccentric, curves and double bends, which

appeared as fissures, but are simply produced by numerous small dots which have taken on a deep blue stain with hæmatoxyline. Aside from these the outer layers and especially the posterior ones of the nucleus are dotted throughout with these same blue spots. They are larger in the peripheral than in the more central layers. Even with immersion lenses no structure can be made out in them; they appear, however, slightly granular. I consider these dots as the product of some chemical substance formed at the very beginning of the fiber destruction, which has a particular affinity for hæmatoxyline. Eosine does not stain them.

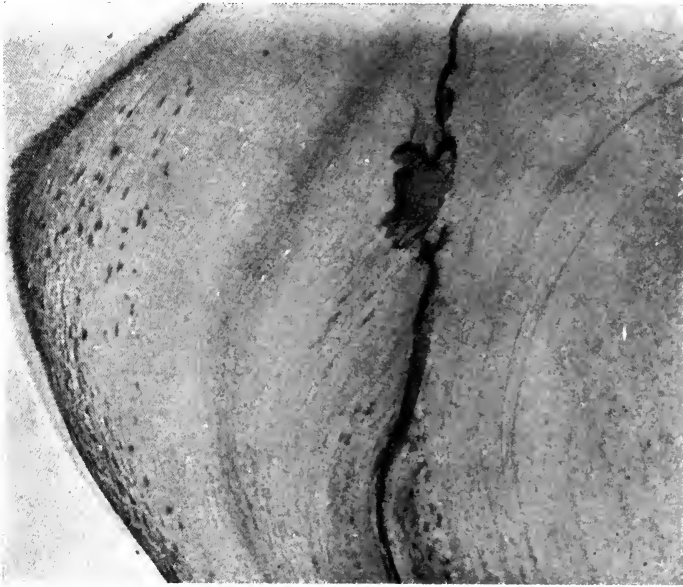


FIG. 2.

Behind the æquator the young lens-fibers just inside the capsule appear partly filled with and partly pressed asunder by a light transparent fluid material which stains with eosine slightly, but not with hæmatoxyline. It looks very much like what Becker described in the juvenile cataract. The lens-fibers here are evidently beginning to undergo a regressive metamorphosis.

The two eyes, taken from a dead body, had *intra vitam* both shown macroscopically visible striæ. I cut both into

æquatorial sections. They seem to represent stages of cataract formation just a little farther advanced than the previous one.

In the right eye the cortex and capsular epithelium were perfectly normal in appearance. The nucleus, however, to its very center was dotted with millions of dark-blue spots of varying size, largest and very large at its anterior and posterior surfaces. These dots in the æquatorial sections were in places arranged in lines forming radii. In one section I counted thirteen such radii. These start at some distance inward from the capsule and run toward the center. In several sections some of them meet here and form an irregular star. Some few concentric fissures which contain myeline drops lie in the periphery. (Fig. 3).

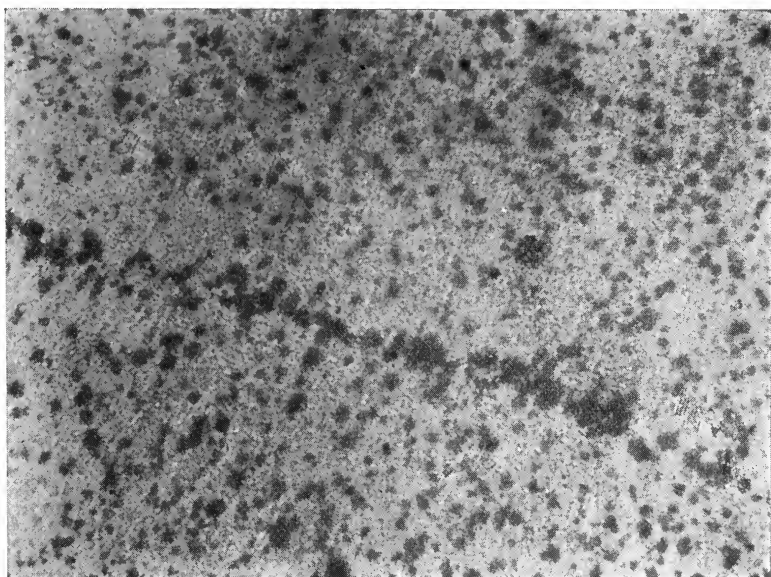


FIG. 3.

In the left lens the cortex appeared broader and not as firm, but not altered so far that its elements could not be recognized. The peripheral layers of the nucleus were dotted with innumerable dark blue spots of varying sizes, not, however, as large as in the other eye. They were largest near the posterior surface of the nucleus. In this lens, too, these dots formed a number of radius-like lines, which starting at some distance

from the capsule, ran inwards towards the center. In some sections I counted ten such radii.

These dotted radii evidently correspond to the radii of the lens star and are the histological substratum for the striæ macroscopically seen during life.

Aside from these larger dots innumerable smaller ones lie in the cementing substance between the lens-fibers and thus outline the fibers beautifully. (Fig. 4).



FIG. 4.

The capsular epithelium is everywhere normal, excepting at the peripheral terminus of one suture. Here a larger amount of myeline lies in the place of degenerated lens-fibers and the formation of vesicular cells has begun.

In another eye, removed from an old man on account of a conjunctival sarcoma, the lens had *intra vitam* been quite hazy, but no striæ were visible. In this lens the capsular epithelial cells were perfectly normal. Aside from a few fissures I found nothing abnormal excepting again innumerable small spots stained dark blue with hæmatoxyline which were distributed throughout the lens, leaving but the most peripheral layers of the cortèx free. In this lens, as in the first one here described, these dots nowhere formed radii.

Only at the peripheral termini of the lens sutures larger and smaller drops of myeline took the places of degenerated lens-fibers and in these places some vesicular cells had been formed.

Without going further in this detailed description of lenses being in a similarly early stage of cataract formation, I may here sum up, that evidently the sclerosis and death of the lens-fibers cause, first, the formation of fissures between the fibers, then the destruction of the outer parts of the fibers probably aided by imbibition of fluid which sets their contents free in the shape of myeline drops. At the same time certain chemical substances result from this tissue death which by the staining with hæmatoxyline become visible as dark-blue spots. While these spots may appear in almost all the parts of the lens-tissue except the epithelial layer, they appear most numerous and largest near the posterior surface. These same chemical substances may be more especially located in the seams of the lens-fibers and thus form radius-like lines, which seem to be the earliest histological substratum for the striæ seen macroscopically *intra vitam*.

That various abnormal chemical combinations are produced during cataract formation is very evident from the peculiar manner with which such lenses take up the different stains. While some parts are evidently acidophile others are decidedly basophile, as is undoubtedly well known to every one who has paid some attention to this subject.

The chemical substance here referred to possibly and perhaps probably may act as an irritating toxine on the capsular epithelial cells and on the younger æquatorial lens-fibers and thus perhaps stimulate them to the changes later on observed within them.

That this substance, whatever its character, is later on diffused, or at least that it is later on formed in a more general way, is evident by the fact that at later stages these small dots are no longer seen, while, however, large portions of the lens take up the hæmatoxyline stain much more eagerly than others.

The diffusion or more general generation of this substance seems to usher in the further disintegration of lens-fibers, as well as the changes in the capsular epithelial cells and the younger lens-fibers.

Of such changes consecutive and secondary to the degeneration and regressive metamorphosis of the older lens-fibers I have seen the following.

I have never seen the typical cell nodules formed by a proliferation and hyperplasia of the capsular epithelial cells as Becker has described them as atrophic hyperplasia. He found them especially around so-called colloid deposits on the inner surface of the anterior lens-capsule.

I have seen, however, in a number of lenses that the proliferation of the capsular epithelial cells had led to a duplication and triplication of this layer. In one case I found numerous rows of cells growing from this layer into fissures between the neighboring degenerating lens-fibers.

In quite a number of cases, especially of consecutive cataracts, I found lying close to the anterior capsule, which in these cases always was wrinkled, a tissue closely resembling connective tissue and with a lamellar arrangement very similar to the cornea. As in these cases the capsule was intact, it is more than probable that this strange tissue had been produced by an abnormal process from the anterior capsular epithelial cells, which are wanting in such cases. I have had occasion to describe a similar tissue as formed by the endothelium on Descemet's membrane (AMERICAN JOURNAL OF OPHTHALMOLOGY; April, 1896), the cells of which are identical with the anterior capsular epithelial cells as regards their shape, arrangement and general behavior, if they are not of the same origin. Such newformed lamellar tissue was also described by myself (Lectures on the Human Eye) and later by Becker and Collins (*Ophthalmic Review*) as found in the cone of anterior polar cataracts. It has also been produced experimentally by Leber and corresponds to what Becker calls the true capsular cataract. In one lens I found the amount of this tissue so great that I have a suspicion that at some time the lens-capsule had been wounded, although I could find no other evidence to support this suspicion. Enclosed between its lamellæ were here and there small rows of cells evidently derived from the capsular epithelium and surrounded by a small quantity of myeline, probably formed by these cells.

In a number of cases I have seen a partial or total lining of the posterior lens-capsule with newformed epithelial cells, a few times even in cataracts which were otherwise but little ad-

vanced. Becker calls these newformed epithelial cells on the posterior capsule pseudo-epithelium. According to him, they are derived from the anterior capsular epithelial cells which, when the æquatorial young fibers are destroyed, find themselves freed from their opposition and grow backwards along the inner surface of the capsule. I, also, have specimens which seem to prove the correctness of this opinion. Yet, the question remains open, why this backward growth of the anterior epithelial cells does not happen more often in cases of cataract. When this newly-formed epithelium lines the whole of the

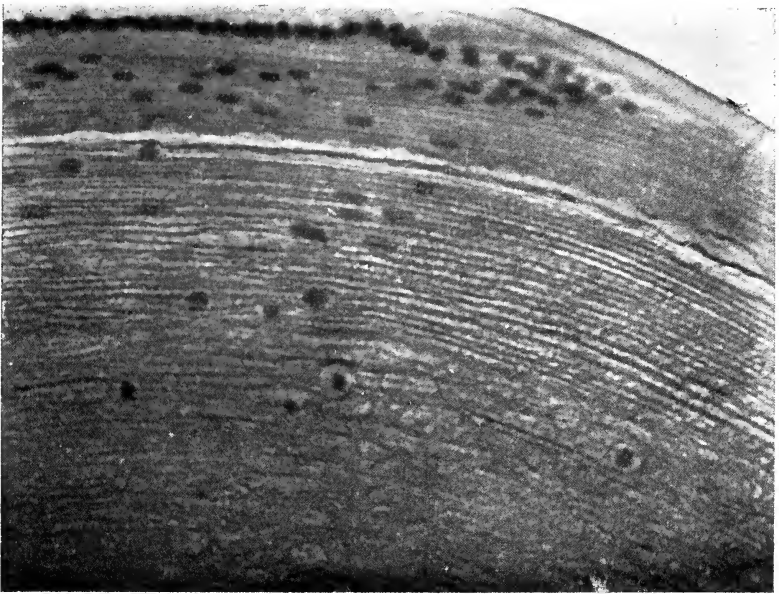


FIG. 5.

posterior lens-capsule it appears very much like that of the anterior capsule. Yet, its cells are usually flatter and their nucleus appears more oval; sometimes also a cell is found with an enormous round nucleus. Frequently small portions are free from epithelium and then the arrangement of cells is naturally not as regular as on the anterior lens-capsule.

The lack of opposition from the normal contents of the lens, due to the sclerosis, formation of fissures and destruction of the lens-fibers, especially at the æquator, is, according to

Becker, the first cause, also, of certain changes in the young æquatorial lens-fibers and the epithelial cells which lead to the formation of the now well known spindle-shaped enlargements and vesicular cells. I am inclined to think that other factors help in producing these cells among which again the imbibition of the fluids from without is one of the most active.

I have had occasion to study these processes in their earliest beginning.

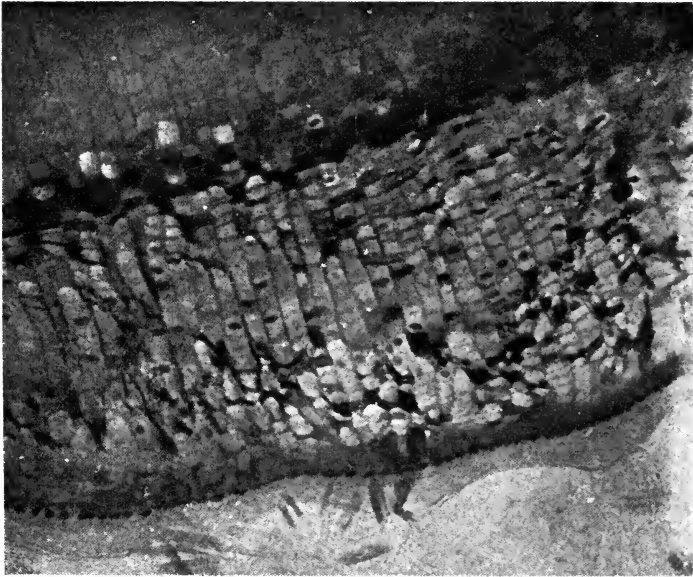


FIG. 6.

In a lens otherwise almost normal and presenting but a few fissures and in which there was particularly no alteration in the capsular epithelium, I found that some of the youngest lens-fibers at the æquator had lost their regular outline and had become slightly wavy. Others looked as if they were getting liquefied and spreading in parts. (Fig. 5). Here and there a nucleus was seen changed from its normal oval shape to a round one, was surrounded by a light, round area of a material which did not take on any stain from hæmatoxyline, but a slight tint from eosine. Around some nuclei this area had grown considerably. As this process goes on, whether it is due to a degenerative process within the fiber alone or in combination with the

imbibition of fluid material from the neighborhood, the well-known round, oblong and spindle-shaped enlargements of the

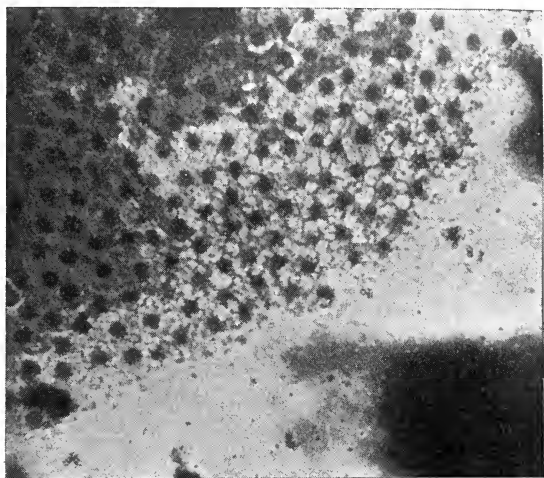


FIG. 7.



FIG. 8.

fibers are formed. That they grow at the expense of the neighboring fibers which atrophy is especially well seen in æquatorial sections. (Fig. 6).

In a similar manner the vesicular cells, which sometimes

obtain an enormous size, are formed from the capsular epithelium, especially near the æquator. In a number of lenses I have found the lens-fibers at the peripheral termini of the sutures totally destroyed and their myeline free in the shape of drops and globules. In every one of these lenses I found that the neighboring capsular epithelial cells had assumed the star- or spider-like shape, which I have described as the condition of unrest due to an irritant as observed in Descemet's endothelium (AMERICAN JOURNAL OF OPHTHALMOLOGY, February, 1896). This protoplasm, instead of having the normal hexago-



FIG. 9.

nal shape, is in an irregular manner in parts contracted towards the nucleus, leaving but a few thin prolongations by which the neighboring cells touch each other, with open spaces between them, through which I think the fluids from the outside can more rapidly pass into the lens-tissue. (Fig. 7).

Among these cells a number of nuclei are seen to be surrounded by a light area, which is larger than a normal cell and acts when stained with hæmatoxyline and eosine like the one just described in the young lens-fibers. The nucleus of such a swollen cell is usually smaller than that of the surrounding cells.

(Fig. 8). Gradually, as the neighboring lens-fibers disintegrate more and more, this light area increases in size and thus these cells grow larger and larger, living, so to speak, on the fat of the land. That, at first at least, these vesicular cells are not simply cells which are undergoing a hyaline, colloid or dropsical metamorphosis, seems to be probable on account of the existence of two and three nuclei in some of them, unless this is brought about by an early coalescence of neighboring cells. (Fig. 9). The neighboring epithelial cells may remain for a time apparently intact or join in the process of vesicular swelling, or they

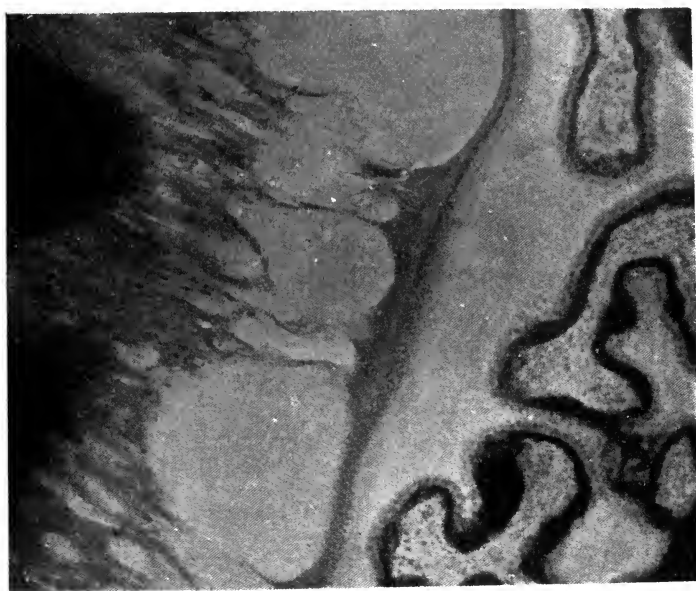


FIG. 10.

disappear by atrophy from pressure. Finally death overtakes the vesicular cells, also, their nuclei disappear and neighboring cells coalesce with each other. In this way smaller and larger cavities may be formed which contain a coagulable substance which takes on a slight stain with eosine. This is probably the way in which a Morgagnian cataract begins to form. (Fig. 10).

The course of the formation of a cataract from the foregoing seems to be: First, excessive physiological regressive shrinkage, called sclerosis, of the nucleus, causing smaller and larger fissures to appear between the lens-fibers. Then imbi-

bition of lens-fibers with fluids from the outside, aiding in the destruction of these fibers, more especially at the æquatorial terminus of the seams. The formation of chemical substances which may act as irritants on the younger fibers and the capsular epithelium. The formation of spindle-shaped swellings in the lens-fibers and of vesicular cells in the epithelial layer, especially near the æquator, which seems to be enhanced, if not directly caused, by imbibition of fluid from the outside which is at first located around the nucleus of the fibers or cells. Such an imbibition is made easier by the peculiar change in the epithelial cells described above by means of which numerous minute portions of the lens-capsule become devoid of their protoplasmic lining. Further imbibition and the growth and confluence of vesicular cells may then lead to the formation of large cavities filled with the fluid these cells contained, and thus to the formation of a Morgagnian cataract may begin. Incidentally, further proliferating changes may occur in the capsular epithelial layers, as the newformation of epithelial cells in larger nodules (Becker) or forming several parallel layers, or leading to an epithelial lining of the posterior capsule, or, finally producing a peculiar lamellar tissue which very much resembles connective tissue on the inner side of the anterior lens-capsule.

To these may later be added further products of regressive metamorphosis as deposits of lime, crystals of fat acids and cholesterine, etc.

ASTIGMATISM ACQUIRED BY A CHANGE IN THE CURVATURE OF THE CORNEA.

BY SWAN M. BURNETT, M.D., PH.D., WASHINGTON, D. C.

IT has been generally agreed that regular astigmatism is due, in the main, to a faulty curve in the corneal surface, and that it is congenital and permanent. To the first proposition there are quite a number of exceptions, as the use of the the ophthalmometer has taught us. We now know that there is a normal and almost uniform amount (about 0.5 D. and "against the rule") of astigmatism, referable to the lens, and that in some instances it has been very considerably more.

The second proposition has been much more universally accepted and it has even been questioned whether there are any genuine deviations from the rule, except in cases of traumatism. It is true a number of cases have been placed on record and by very accurate observers, showing a development or increase in astigmatism from year to year, and particularly in the early periods of life, but in such reported cases as have come under my notice, it has been nothing more, apparently, than the becoming manifest of an astigmatism held latent by some action of the accommodation. There seems to be no doubt that with increasing age and almost *pari passu* with loss of accommodative power, an astigmatism may become apparent which was not manifest before, even under the influence of a cycloplegic agent.

At the last meeting of the American Medical Association in Denver (1898) the question was under discussion in the section of ophthalmology, and several members gave experiences with an increase of astigmatism in their own eyes. Thus, Dr. G. C. Savage had noted an increase from -0.5 to -2.25 axis vertical. The ophthalmometric measurements when he was examined by that instrument gave the last amount of astigmatism, and it has remained, subjectively, at the same for the last nine years. Dr. Edward Jackson, whose careful work in this department we are all familiar with, has found his astigmatism, under a mydriatic, increase from 0.5 in one eye, and 0.75 in the other, to 1.75 and 2 , respectively. He did not give the measurement of the ophthalmometer in his case. Other members reported like experiences either in their own persons or in their patients. Javal also noticed the evolution of an astigmatism with increasing years.

Most of these men are of the opinion that the development of the astigmatism was due to a change in the lens, and most of them think it caused by an alteration in its position. The influence of a partial action of the ciliary muscle has also its supporters. It seems rather remarkable that, though the ophthalmometer has been in very general use in this country now for a number of years, no case has been brought to notice, which I remember to have seen, where a marked and permanent change took place in the corneal astigmatism independent of a traumatism. Some instances of change in the cornea due to pressure of a chalazion have been reported, but the astig-

matism has disappeared on removal of the growth. My own use of the ophthalmometer dates back to 1885, and I examine every patient by this method that applies with any but acute inflammatory trouble. Many patients naturally come back for a change of glasses, re-examination, etc., and in every such instance another examination with the ophthalmometer is made. I have noted from time to time slight discrepancies in the result of these different examinations, often amounting to 0.5 D. or even more, but have always been inclined to put them down to a fault in observation, since it is easy to commit such an error, particularly with the varying light of day, which is what I use in my ophthalmometric examinations. In the following case, however, the change is so marked that I deem it worthy of being placed on record as a contribution to the study of the question in hand.

Miss Helen S. was first brought to me on January 23, 1893, when she was 12 years old, to be treated for an attack of sub-acute conjunctivitis. She had then $V. = \frac{5}{1x}$ in both eyes. The shadow-test revealed a small amount (-0.5 D.) of astigmatism according to the rule in both, but this glass gave no material improvement in vision. The ophthalmometer gave R. $180^{\circ} 45\frac{1}{2}$ with a crossing of the mires of 1 D. at 90° ; L. $180^{\circ} 45\frac{1}{2} 90^{\circ} \times 0.5$ D. It would appear from the record that she paid me several visits and there seems to be no reason to suppose I did not exercise my usual care in the various examinations. The conjunctivitis subsided and no glasses were ordered.

Within the last two or three years, however, she has noted a gradual failing in the distant vision of the right eye particularly. On November 25, 1898—that is nearly six years after the first examination—she again presented herself for treatment. The condition then was as follows:

R. $V. = \frac{5}{xx}$; L. $V. = \frac{5}{1x}$. The ophthalmometer showed R. $180^{\circ} 44\frac{1}{2} 90^{\circ} \times 3\frac{1}{2}$; L. $180^{\circ} 44\frac{1}{2} 00^{\circ} \times 1$. She was put under homatropine gr. j ad $\bar{5}j$, a drop to be put into each eye every fifteen minutes for two hours. At the end of that time the shadow-test gave: R., $+0.75, -2.75$; L. -0.25 , the examination being made with a plane mirror at a distance of one meter. I observed in this examination the appearance of the "internal shadows," much like the dark crescent of conical cornea, in the bright area of the pupil, to which I called attention some years ago and which I have found to vitiate very much the findings by this method of examination.

R. V. = $\frac{5}{xxv}$, with $+ 0.5 \text{ } \ominus - 2.75 \text{ } 180^\circ = \frac{5}{x}$; L. V. = $\frac{5}{vi}$, no glass improved. After the mydriatic effect had passed off: R. V. $+ 0.5 \text{ } \ominus - 2 \text{ } 180^\circ = \frac{5}{vi}$; L. $- 0.5 = \frac{5}{v}$. These were ordered. There had been no injury to either eye, nor was there any evidence of pathological change either interiorly or exteriorly to which the alteration in the corneal curve could be properly referred. There were no muscular anomalies, and the girl was in otherwise good health.

It will be seen from an examination of this history that there was an increase, in the course of six years, of a corneal astigmatism of 2.5 D. in one eye and 0.75 D. in the other. There was also, apparently, a correcting lenticular astigmatism of 0.75 D. and 1 D. respectively. It is hardly possible that this could have been due to an error in observation, for at the first examination all the methods—subjective, ophthalmometer and skiascopy—practically agreed. The diminished visual acuteness found then is easily referable to the conjunctivitis. I will not pretend to assign any cause for the change in the corneal curvature which appears to be idiopathic, but would suggest that it is possibly due to a condition of the tissue similar to that leading to the development of conical cornea which usually manifests itself at about the age of the patient and of which it may be the beginning in this instance. A further study of the case, which I hope to be able to make, should throw some additional light upon this point.

EXOPHTHALMIC GOITRE ATTENDED BY RAPID INCREASE IN MYOPIA, OCCURRING IN AN ELDERLY SUBJECT.

BY CHAS. H. BEARD, M.D., CHICAGO, ILL.

THE patient in question, Mrs. S., from a neighboring town, a woman of unusual intelligence, and of great respectability, first consulted me September 3, 1895, though she had been known to me for several years previously. At the time of her first visit she was 61 years of age, hale, stout (weighing 175 to 180 pounds), looking and feeling well in every way. She was one of a large family of healthy children, several of

whom, both older and younger, are still living. She, however, had been considered the strong one of the family. Her only apparent bodily defect was myopia. This she thought she had always had, and it was with the view to a possible needed change in her glasses that she first came to me. She was the only one of the immediate family connection who was near-sighted. She was the mother of eight children, four of whom are living. None had eye trouble of any kind. The patient remembered that at the age of 18 years she wore glasses of the strength of $-1/11$ (about -3.5 D.). At her first visit to me I found that her glasses were both -4 D. Tests of her vision and refraction then resulted as follows:

R. E., V. = $10/66$, $20/xx$ w. — 5 D.

L. E., V. = $10/66$, $20/xx$ w. — 5 D.

For reading she required -1 only. In all other respects her eyes were normal. Prescribed the above lenses in bifocal spectacles.

I heard nothing more from Mrs. S. for more than two years (December 9, 1897), when she came again to my office, having but lately come home after a sojourn in California. That, meanwhile, a tremendous change had occurred in her physical condition was evident from her striking appearance. She was emaciated in the extreme. Her last recorded weight had been 110 pounds, but she averred that since that she had been still further reduced until she could not have possessed over 100 pounds. The eyes were in a state of marked exophthalmos, with both the von Graefe and the Stellwag symptoms conspicuous. The pupils were normal excepting, perhaps, a little too large for one so old. Tests of vision and refraction now gave:

R. E., V. = $4/66$, $20/xxx$ w. — 10 D.

L. E., V. = $6/66$, $20/xxx$ w. — 6.5 D.

The ophthalmoscope verified as to these conditions, but showed no lesion. There were no conii about the optic discs. The media were all perfectly transparent. No ocular paralyses nor pareses. The ophthalmometer showed no astigmatism. There was no loss of function in any nerve of special sense.

She stated that all had gone well with her after her last visit for a few months, when she noticed a peculiar appearance of the nipple of the right mammary gland. She consulted her family physician, with whom I am personally acquainted, and

whom I know to be a man who stands high in the profession. He pronounced the trouble carcinoma, and in June, 1896, he removed the gland and adjacent lymphatics most thoroughly. None of her near relatives had been afflicted with carcinoma. Even in her case she had not been aware of an actual tumor or any swelling of the mamma, but merely of the retraction of the nipple. In the fall and early winter of 1896 she was in constant attendance upon her husband who was sick with carcinoma of the stomach. He died in December, 1896. Then she found herself greatly run down physically and was prevailed upon to go to Southern California, hoping to renew her strength. Her weight at this time was 165 pounds. After arriving in Pasadena her illness increased. She became the victim of an uncontrollable and persistent diarrhoea, and of a dreadful lassitude—she was always tired. She asserts that she lost weight at the rate of two pounds per week for eight months. She had insomnia; alternating polyuria, and scantiness—usually the latter; paroxysms of pyrexia, or at least of excessive heat. Throughout, however, her appetite remained good.

Dr. Norman Bridge, of Chicago and Pasadena, who made an examination of Mrs. S.'s case in the latter city May 5, 1897, has kindly furnished me with the following additional notes:

"Patient has taken protonuclein almost constantly since the operation." (Referring to the excision of the mammary and lymphatic glands. I have taken the liberty of italicizing this sentence). "Weight now (three weeks ago) 148 pounds—January, 1897, 165 pounds. Weight when well 173 to 180 pounds. Took cold in head February 1, 1897. Head felt filled up. Still filled up. Mouth dry, full of slime in mornings. Smells, both sides, equally well. (Numbness in little and ring-finger after operation, and to present time). Since disappeared. Appetite good. Bowels loose rather than otherwise. Has taken powders occasionally of calomel and rhubarb, āā gr. ijss, and cinnamon, gr. j. Feels weak. Knees give out occasionally on rising a step, etc. Quadriceps extensors weak. Can not rise from a low chair without the aid of her hands. Knee-jerks excessive, ankle-clonus slight—right. Tremor of all four limbs on motion; face also—intention tremor. Still when at rest. No nystagmus. Is more nervous, not irritable. The trembling

makes her desirous of getting away by herself—at times. No headache. Says weakness has developed rapidly in the last three weeks, *i. e.*, on rising, also on standing, knees may tremble—"a giving-away" sensation. No urine symptoms, save scantiness at times. No albumen; no sugar."

She had never suffered from dyspnoea nor palpitations, though her pulse was rapid; and there was slight enlargement of the thyroid, more marked in the right lobe. Examination of the urine was negative. As the patient expressed herself as feeling very much better—only weak—I simply gave her stronger minus glasses and allowed her to go home.

On October 31, 1898, she came back again, declaring that she could no longer see so well with her glasses at a distance. In the interim her general health had vastly improved. She weighed probably about 130 pounds. The exophthalmus, however, notwithstanding the increased fullness of the face, was just as marked as ever. The pupils were still normal, excepting the possible slight dilatation. The intra-ocular tension was slightly lowered in both. Now:

R. E., V. = $\frac{2}{\text{cc}}$, $\frac{20}{\text{L}}$ w. — 13 D.

L. E., V. = $\frac{4}{\text{cc}}$, $\frac{20}{\text{xxx}}$ w. — 9 D.

The ophthalmoscope as yet revealed no lesion of retinae or choroideae. It may be that there was a tittle of pallor in the papillae and a suspicion of smallness in the retinal vessels. The fields for white and colors were normal. It seemed that there had been further enlargement of the right lobe of the thyroid gland, but as to this I could not be positive. There was no pulsation visible in the retinal vessels and no bruit could be detected in the orbits. The heart-sounds were normal, but there was a pulse of 110 shortly after coming in from a gentle walk and no climbing, and of 96 after sitting quietly for three-quarters of an hour, though perfectly regular. On further questioning as to the patient's family history, it was ascertained that her eldest sister and her (the patient's) eldest daughter had goitres, though the daughter's was very slight. There was still no paralysis, and the other special senses were all perfect. Mrs. S. had never suffered any traumatism. Unfortunately, I have not tested the patient as to her electrical resistance. I found that the carotids were quite tense, and Mrs. S. informed me that fifteen years before, while working

over a very hot stove, on a very hot day, canning fruit, she suddenly lost the use of her right arm, but that within an hour or two it recovered; and that three years ago there had come a subconjunctival ecchymosis, but is not sure as to which eye was affected. I have not dared to use a cycloplegic in this case for fear of the effect on the choroidal and retinal circulation, but am convinced, from the various other tests and from the activity of the accommodation for one at her age, that the myopia is not simulative. Repeated examinations of the urine, both microscopic and reactionary, have failed to discover any abnormalities.

At the patient's last visit, December 19, 1898, the various conditions were unchanged, save that the general health was steadily growing better, and her weight, as last recorded, was 140 pounds. The tension of the globes, too, at this visit, was more nearly normal—it may be—quite so.

This case, to me, has been one of exceeding interest. Here we have, practically, every symptom of exophthalmic goitre, both major and minor, suddenly developed in an individual past 60 years of age; and, simultaneously, a remarkable increase in the previously existing myopia, amounting in the right eye to eight or nine dioptries, and in the left to four or five. This phenomenon has a number of times been mentioned in ophthalmic literature as occurring in conjunction with diabetes mellitus. Never, however, was there, in this case, a trace of sugar found in the urine, although it was repeatedly examined—first, by her family physician, then by Dr. Bridge, and lastly for me by Dr. Brougham, Pathologist to the Passavant Memorial Hospital. Even had there been, at any time, glycosuria present, the fact, taken together with the other conditions, would only have served to emphasize the theory of ophthalmic goitre, since it has been established not only that excretion of sugar by the kidneys is easily brought about in patients suffering from Basedow's disease (Meynert's and Chvastek's clinics were able to produce alimentary glycosuria with great facility in patients who had Graves disease ["Sajou's Annual," Vol. II, page 491]), but that it is not an infrequent symptom. These facts have led me to wonder if some of the cases reported of sudden and rapid increase in, or development of myopia, as accompanying diabetes may not have really been in relation to obscure exophthalmic goitre with glycosu-

ria. In view of the comparatively little that is known of the pathology of the two diseases such would seem more relevant.

Reverting to the case here in question, it has occurred to me since receiving the *hint* contained in Dr. Bridge's report, that it is not unlikely that the continued ingestion of protonuclein might here afford a possible clue as to the causation. This substance is said to be a combination of animal extracts. Among those who have made special study of the physiological effects of the thyroid extract, for example, it is pretty well agreed that its administration would be decidedly contraindicated in cases where there existed an enlargement of the thyroid gland. A *tendency* to goitre might also furnish an incompatibility. Furthermore, the query arises, are we prepared, authoritatively, to deny that even others like the so-called lymphoid and other glandular extracts may not, in certain pre-existing dystrophies, yet further disturb the metabolic forces and lead to grave consequences? The time is drawing near, no doubt, when the influences exerted by these compounds—the toxins, etc., on the animal economy will be comparatively clear to the medical mind; at present, in addition to being highly subtle, their action is profoundly obscure.

In justice to the physician who prescribed the remedy in this instance, let me add that his action in the matter was absolutely above reproach, even granting that the above extremely vague surmises could be substantiated. He was only following the popular teaching of the day. Yes, better than that, for in proof of his foresight and caution, he actually questioned and examined the patient with regard to an enlarged thyroid and decided, before giving the treatment, that there was none. Had the contrary been not only true, but most apparent, he would still have had warrant for what he did; for, while I stated above that it was pretty well agreed as to the harmful effects of the thyroid extract in exophthalmic goitre, I am perfectly aware that some men of eminence have advocated its use in this very affection, and, moreover, have reported series of cases as benefited thereby.

In conclusion, I wish to state that I report this case solely on account of the two things mentioned in the heading, which struck me might interest my colleagues, and these later remote conjectures are wholly secondary.

MEDICAL SOCIETIES.

FOURTH ANNUAL MEETING OF THE WESTERN OPHTHALMOLOGICAL AND OTOLARYN- GOLOGICAL ASSOCIATION.

IN spite of the cold weather and obstacles of travel in consequence of this, the meeting of the Western Ophthalmological and Oto-Laryngological Association, held on February 10 and 11, in New Orleans, La., was very well attended. The scientific work was interesting and instructive.

DR. G. T. STEVENS' excellent address was of unusual interest and highly appreciated.

The social features through the well-known hospitality of the citizens of the Southern Metropolis were most enjoyable.

The following officers were elected:

W. SCHEPPEGRELL, New Orleans, President.

DR. M. A. GOLDSTEIN, St. Louis, DR. CASEY A. WOOD, Chicago, DR. E. C. ELLETT, Memphis, Vice-Presidents.

DR. F. C. EWING, St. Louis, Secretary.

DR. W. L. DAYTON, Lincoln, Neb., Treasurer.

The next meeting will be held in St. Louis on the second Thursday, Friday and Saturday in April, 1900.

AMERICAN MEDICAL ASSOCIATION—SECTIONS ON OPHTHALMOLOGY, AND LARYNGOLOGY AND OTOTOLOGY.

AT THE June meeting of the American Medical Association at Columbus, Ohio, in addition to their regular programs, the Section on Ophthalmology and that of Laryngology and Otology, will devote the morning of the second day, June 7, to a joint meeting, under the chairmanship of Dr. Casey A. Wood, of Chicago, and of Dr. Emil Mayer, of New York.

The subject for discussion will be "The Relation of Ocular Diseases to Affections of the Nose and Neighboring Cavities."

Four papers will be read on this subject, by invitation, as follows:

1. DR. CHARLES STEDMAN BULL, of New York, "Some Points in the Symptomatology, Pathology and Treatment of the Sinuses Adjacent and Accessory to the Orbit."
2. DR. D. BRYSON DELEVAN, of New York, "Nasal Stenosis in their Relation to the Ocular Disturbances."
3. DR. JOSEPH A. WHITE, of Richmond, Va., "Eye Troubles Attributable to Naso-Pharyngeal and Aural Disturbances."
4. DR. J. H. BRYAN, of Washington, D. C., "Diseases of the Accessory Sinuses in Their Relation to Diseases of the Eye."
5. General discussion on the main question.

PAMPHLETS RECEIVED.

"Further Report on Xeroform in Ocular Therapeutics," by B. Wicherkievicz, M.D.

"Some Remarks About the Study of Medicine in Germany," by E. Amberg, M.D.

"Some New Throat Instruments, With indications for Their Use," by G. H. Makuen, M.D.

"On Continuous Sterilization for Knives and Other Cutting Instruments," by J. A. Lippincott, M.D.

"Thrombosis of the Lateral Sinus, Dependent Upon Suppurative Otitis Media," by E. B. Dench, M.D.

"Radical Cure of Inguinal Hernia by Fowler's Method, With Reports of Cases," by H. O. Walker, M.D.

"Infective Intracranial Complications of Aural Disease,—Diagnosis and Treatment," by A. Timberman, M.D.

"Removal of the Tarsus and Retrotarsal Folds in Certain Cases of Chronic Trachoma," by C. A. Wood, M.D.

"Further Observations Regarding the Use of the Bone-Clamp in Ununited Fractures, Etc." by Cl. Parkhill, M.D.

"The Phonendoscope and Its Practical Application." Lectures by Aurelio Bianchi, M.D., F. Regnault, M.D., and M. Anastasiades, M.D. Translated by A. G. Baker, M.D.

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NO. 3.

ORIGINAL ARTICLES.

A REPORT OF CASES OF BELL'S-PALSY AND
EPILEPSY, CURED BY THE CORRECTION
OF AMETROPIA AND HETEROPHORIA.¹

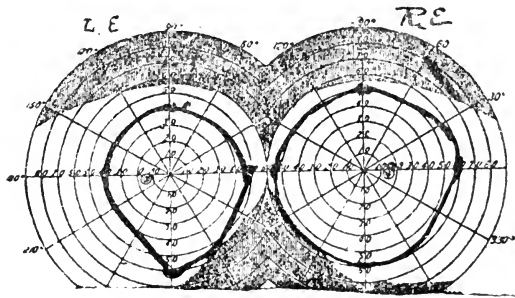
BY L. R. CULBERTSON, M.D., ZANESVILLE, OHIO,

OCULIST TO U. S. PENSION BUREAU; C. & M. V.; B. Z. & C. RYS.; CITY HOSPITAL, ETC.

CASE I.—Mr. G. H. B., referred to me by Dr. W. C. Frew, of Coshocton, Ohio, aged 22 years, consulted me April 4, 1898. Strong and robust; family history good; no syphilis, hereditary or acquired; no epilepsy or rheumatism. Has had typhoid fever three times, the last time five years ago, but it did not leave any sequelæ. He says that several weeks since, when the palsy (Bell's) came on, his face was swollen and sore and the left side of his face was numb. His face was not red. He did not have any soreness or numbness of any other part of the body except the tongue, the left side of which was numb. He also had difficulty in speech, *i. e.*, difficulty in saying what he wished to. When the attack came on he had great and very sharp pains in the eyes which had to be relieved by morphine. His mouth is drawn to one side. There was no hemianopsia during the attack, nor ringing in the left ear. T. both +. He says that when he sings his voice "sounds like a cym-

¹Read by title at the Fourth Annual Meeting of the Western Ophthalmological and Oto-Laryngological Association, held at New Orleans, La., February 10-11, 1899.

bal." (This is due to involvement of the tensor tympani). He is married, and not hysterical. At times he can not hear so well with left ear. Fork tests: examination of ear and throat show H. normal. (This symptom of difficulty in hearing without any disease of the ears is due to a too great tension of drum caused by overaction of the tensor tympani and is quite a frequent symptom of heterophoria). No anæsthesia. No hemianopsia. Color-vision and color-fields normal. He smokes from five to ten cigars a day. Consensual and direct light reflexes normal. His mouth is drawn to the right and he can not close the left eye.



Ophthalmoscopic examination: R. E., veins very large and tortuous and arteries somewhat diminished in size. Slight papillitis. Disc pale and slightly cupped. R. E., veins very large and tortuous; disc quite hazy from papillitis, pale, and shows marked cupping.

Muscle tests: R. H., $\frac{1}{2}^{\circ}$. Esophoria, 1° . Esophoria in acc. $2\frac{1}{4}^{\circ}$. Abduction, 2° ; Add., 20° . R. Sur., 3° ; L. S., $2\frac{1}{2}^{\circ}$.

Retinoscopy shows (atropia) + 2.75 s. \ominus — 25 cyl. 180° each eye. I gave for distance R., + 1.5 s. \ominus — 25 cyl. 180° ; L., + 1.25 s. \ominus — 25 cyl. 180° . For near vision I gave R., + 2.25 s. \ominus — 25 cyl. 180° \ominus 1° prism base in; L., + 2 s. \ominus — 25 cyl. 180° \ominus 1° prism base in. A solution of salicylate of atropine grs. vj to ʒj was used for twenty-four hours, but the accommodation was not entirely suspended.

September 24, 1898. Abd., 7° ; Add., 20° . R. S., 2° ; L. S., 2° . Retinoscopy and atropia gave the same results. I will have him wear the same glasses but leave off the prisms. The facial paralysis has entirely disappeared.

CASE II.—Mr. F. G., aged 27 years, referred to me by Dr.

C. O. Dunlap. Has been a sufferer from epilepsy, both *petit* and *grand mal* for five years. He says that at times his muscles swell into knots; he also has difficulty in speech and his tongue becomes so swollen that he can scarcely speak and the swelling is so great that the teeth leave their imprint on the tongue. (This is true as I found when examining the tongue while it was in this condition). Dr. Dunlap states that at times the sphincter ani can only be dilated when the utmost force is exerted on the speculum. His digestion is bad and he has frequent bilious attacks. He does not sleep well; has taken a great deal of bromide, and has a constant ringing in the left ear. Hearing is normal and there is no disease of ears. The tubes are open. There is some chronic pharyngitis (probably a reflex disturbance from the eye strain).

Ophthalmoscopic examination: R. E., arteries too fine, veins enlarged; disc normal. L. E., arteries quite fine and have a peculiar glistening appearance, due to lack of blood in them consequent upon the arterial tension of epilepsy; veins enlarged; disc normal. Esophoria, 2° . R. H., 3° . Adduction (under mydriatic), 25° . I had him use atropine sulph. sol., grs. viij to 3j for a week. Then retinoscopy gave $+1.75$ sp. each. Under the mydriatic he only accepted $+1$ sp. which gave $V_2 = \frac{6}{VI}$. Without the mydriatic $+1.25$ sp. = $\frac{6}{XII} V_2$. I had him continue the atropia for several weeks and exercised the adduction under mydriatic. Then I stopped atropia and continued the exercise which was carried to 45° and then stopped. As he still had 3° R. H., I combined 1° prism with bases up and down respectively before each eye combined with the spherical correction. A month later the prisms were dispensed with, as the hyperphoria had disappeared. The ringing in the ear had also ceased, the bowels were regular, the appetite good, and he slept well. For ten months he did not have any epileptic fits, then they returned.

December 18, 1897. Esophoria, 6° ; abduction, 0° ; add., 12° . December 28. I performed tenotomy of the right int. rectus.

January 10, 1898. Adduction, 30° ; abd., 6° . January 11. I divided left int. rectus. January 22. Adduction, 39° . Exercise continued.

February 12. Adduction, 36° ; abd., 8° . R. S., $2\frac{1}{2}^{\circ}$; L. S., $2\frac{1}{2}^{\circ}$. Patient has had no epileptic fits since then. His health

is greatly improved, and he has no more swelling of the tongue, but still has constipation, and piles.

In April, 1898, molten iron was blown on conjunctiva of right eye. The wound healed without adhesions, save in lower cul-de-sac, but this did not interfere with the motions of the eyeball. Then he had erysipelas in the eye, but recovered with a posterior synechia and a lens slightly opaque.

REMARKS.

CASE I.—The irritation of the retinae caused by ametropia and heterophoria was one factor in the causation of the paralysis, *i. e.*, the irritation was carried through the optic nerves and from thence reflected into the centers of the fifth and seventh nerves. Then the strain on the third nerve was reflected into the fifth and seventh. The implication of the fifth nerve produced the following symptoms: Numbness of the face and half of the tongue; intensity of hearing (motor branch of fifth through otic ganglion); tensor palati (through otic ganglion); dryness of half of the tongue (from involvement of chorda tympani); glaucoma from irritation of branch going to ophthalmic ganglion and ciliary nerves. The involvement of the facial nerve caused paralysis of the muscles of one side of the face and of the stapedius muscle, causing difficulty in hearing.

Gellé says (*Annals des Maladies de l'Oreille*, November, 1890), that in cases of complete paralysis of the facial nerve the tympanic muscles still act, though they lose some of their power of co-ordination. The difficulty in speech was also due to the involvement of the facial nerve.

CASES FROM THE CLINIC.

BY HENRY DICKSON BRUNS, M.D., NEW ORLEANS, LA.,

PROFESSOR OF DISEASES OF THE EYE, NEW ORLEANS POLYCLINIC—SURGEON-IN-CHARGE OF THE EYE DEPARTMENT, EYE, EAR, NOSE AND THROAT HOSPITAL, NEW ORLEANS, LOUISIANA.

A MICROPHTHALMIC FAMILY.

On July 11, 1898, a pair of poor country people came to the clinic bringing their two little children and seeking to know if anything could be done for them. The elder of the children was a little girl of 5 years, the other a baby boy of 5 months.

Both children were of fair complexion, well-nourished, and of good size for their ages. The eyelids in both patients were closed and deeply sunken into the orbits, and I did not fail to jump at the conclusion that we were about to be presented with another shocking example of atrophy of the globes in two members of one family, as the horrible result of neglected ophthalmia neonatorum. Upon drawing the lids apart the true condition was readily recognized. The two cases were similar in all respects; the four orbits contained four little shrunken globes not larger than very small green peas, or half as large as ordinarily good-sized peas. On each globe was a miniature cornea through which a dark-bluish iris could be partially seen and through pupils the size of pinheads we thought to discern chalky-white and opaque lenses. In none of the orbits could a trace of any other globe, sac or swelling be discovered. The parents stated that the condition had existed from birth (as, indeed, was easily to be seen), and the mother added the surprising information that out of seven children she had born, three had been born with just such "bad eyes." Thus, the first had "good eyes," the second good eyes, the third (the little girl before us) bad eyes, the fourth (still-born) unknown, the fifth bad eyes, the sixth good eyes, and the seventh, the five-months-old baby, bad eyes. The six children were alive and in good health. Such a history naturally led to inquiries into the family and personal histories of the mother and father. In neither case was there any ancestral history of eye disease. The father is a tall, stoop-shouldered young farmer of about 35 years of age, a brownish blond with blue eyes, healthy-looking, and asserting that he has never been ill; his vision = $^{20}/_{xx}$ o. u. The mother is rather short, square, and with stout limbs; a pronounced blonde with clear blue eyes; somewhat chlorotic in appearance. She has the dull, patient, mild, bovine nature and intelligence of a thorough bucolic, and it is difficult to elicit an account of herself. She makes it clear, however, that her general health has been very good, though she has been a terrible sufferer from headaches, but speaks in an obscure way of "fainting spells," with loss of consciousness, that makes me think something of epilepsy, something of hysteria; though from her general appearance, manner, and conversation, I incline to the former. She is 30 years of age, and vision is only $^{20}/_{xl}$ o. u. A most careful examination (under atropine) shows

nothing abnormal in the media or the eye-grounds, but a refractive defect, corrected by the following: R. E., + 0.50 c. ax. 15° — 0.50 c. ax. 105° ; L. E., + 0.50 c. ax. 165° — 0.50 c. ax. 75° , which was ordered for constant wear. Can we suppose that the lack of ocular development manifested in the mother by a degree of regular mixed astigmatism was reflected upon the children as complete microphthalmos?

It was, of course, not to be determined in children so young whether there was any light perception. The father thinks that the little girl can perceive light; he has often noticed the child raising the lids with the fingers as though attempting to see, but this trick is frequently observed in blind children in whom the lids are habitually closed.

GLAUCOMA AFTER CATARACT EXTRACTION; ANTERIOR SCLEROTOMIES; RECOVERY.

A white woman, of German descent, 73 years of age, came to the hospital June 16, 1896. Considering the age, her general health and appearance are good. Eight years ago she had some trouble with right eye. The history concerning the left eye is indefinite. V., R. E. = l. p., L. E. = fingers at six feet. Diagnosis: Right eye, cataract, senile, mature; left eye, cataract, senile, immature.

June 24, 1896. Right eye, extraction without iridectomy, under cocaine, without accident. June 26. Bandage removed, anterior chamber closed, atropine t. i. d.

July 6, 1896. Pupil dilated and nearly round; doing well. July 17. Doing well; a trace of injection.

August 21, 1896. Ciliary injection; iris discolored. August 24. Intense ciliary injection, frontal pain, ordered atropine every three hours. August 28. Ciliary injection greatly diminished; pupil dilated and round.

September 28, 1896. Ciliary injection gone. R. E., with + 10 s. \bigcirc + 3 c. ax. 120° , V. = $\frac{20}{xxx}$.

October 21, 1896. Left eye, extraction without iridectomy, under cocaine, without accident. October 26. Bandage removed; wound healed, no pain; cortical masses in the anterior chamber. October 28. Intense iritis and œdema of bulbar conjunctiva. Atropine six times daily.

November 1, 1896. Injection still intense; pupil not di-

lated. November 9. Ciliary injection less intense, but pupil closed.

December 23, 1896. Left eye, iridotomy under cocaine; good coloboma.

January 15, 1897. No reaction; cornea cloudy.

February 25, 1897. Cornea clearing; atropine.

March 8, 1897. L. E., T. = + 2. March 10. Left eye, anterior sclerotomy under cocaine. March 12. L. E., T. —; eserine t. i. d. March 26. L. E., T. = + 1; eserine six times a day. March 28. L. E., Tn.

April 12, 1897. L. E., Tn.

May 3, 1897. L. E., + 9 s. \bigcirc + 3.5 c. ax. 180° , V. = $\frac{20}{L}$.

September 29, 1897. L. E., T. = + 1; anterior sclerotomy under cocaine.

October 11, 1897. L. E., Tn. Vision with above glasses, R. E. = $\frac{20}{xxx}$, L. E. = $\frac{20}{L}$.

A CASE OF XEROSIS OF THE CORNEA; HEMERALOPIA AND BLEEDING FROM THE GUMS.

A mulatto boy, 10 years of age, came to the clinic on June 28, 1898. He complains that his "eyes have been weak and almost blind at night for about a year." The patient is rather stout for his years and looks well-nourished but anæmic. His parents state that he bleeds quite freely from the gums nearly every night and the gums are pale and spongy-looking. V. = $\frac{20}{xx}$ o. u. The portion of the bulbar conjunctiva exposed in the palpebral opening presents the well-known dark, silky appearance; is not moistened by the tears and is covered with fine foam. The hemeralopia is pronounced enough seriously to interfere with movements after sunset. The boy was placed in the care of Dr. E. A. Robin, the first assistant surgeon of this department, who put him on "mercauro," 5 drops, in water, three times daily, and advised that he be given plenty of fresh vegetables and fruit, especially apples.

July 27, 1898. The general appearance is much improved; weight 70 pounds.

August 28, 1898. Continued improvement in general appearance of patient; weight 70 pounds; the gums have ceased to bleed; V. = $\frac{20}{xx}$ o. u. After this the patient failed to visit the clinic.

All cases of this condition seen at my clinic have been in persons of negro blood. I have not seen bleeding from the gums as a symptom; and this, together with the fact elicited by inquiry, that our patient had been living largely upon salt meat and Irish potatoes, confirms the view that in conjunctival xerosis with hemeralopia we are dealing with symptoms dependent upon some general vice of nutrition.

TWO CASES OF DISCISSION OF THE LENS IN HIGH MYOPIA.

CASE I.—A white married woman, 21 years of age, red-haired, blue-eyed, florid, large, and of good general appearance and health. March 16, 1897. Patient complains that right eye has been troublesome for three or more weeks. From her description and the appearance of the eye she has had attacks of ciliary irritation and hyperæmia, with tenderness and pain. Vision, R. E. = $\frac{20}{6}$, L. E. = $\frac{20}{LXX}$; there is now ciliary injection of right eye. Atropine is instilled in both eyes, and the ophthalmoscope shows in right eye high myopia, a myopic staphyloma to the temporal side of the disc, and atrophy and irregular distribution of the choroidal pigment. Left eye is myopic but otherwise normal. The refraction, under atropine, is found to be: R. E., — 16 s. \bigcirc — 3 c. ax. 15° = $\frac{20}{LXX}$; L. E., — 3 c. ax. 165° = $\frac{20}{XX}$. Discission of the lens of right eye was advised.

March 24, 1897. A moderate discission of the lens capsule was made under cocaine by Dr. Robin, the first assistant surgeon of this department. Atropine instilled.

March 25, 1897. Eye looks well; little reaction; no pain. Pupil kept dilated with atropine.

April 7, 1897. Under cocaine, Dr. Robin broke up lens thoroughly with knife kneedle. Atropine every three hours. April 9. Some ciliary injection, no pain, no tension. Atropine continued.

May 7, 1897. Eye free from irritation; lens thoroughly broken up and being absorbed slowly. Atropine continued.

June 2, 1897. Patient can see to count fingers with right eye. Another thorough discission. June 5. No reaction. Continued atropine.

July 6, 1897. All cortical substance absorbed, some capsule remaining in pupil. Vision, R. E. = $\frac{20}{60}$. July 7. An incision was made in corneal margin with keratome and the

capsule removed with forceps. Slight escape of vitreous. Atropine and a pressure bandage. July 9. Wound healed; some reaction. Atropine every four hours and hot water bathing. July 14. Very little injection remaining; no pain. July 19. Eye looks well. Vision with + 1 s. = $\frac{20}{LXX}$.

December 14, 1897. Vision, R. E. = $\frac{20}{C}$, L. E. $\frac{20}{XX}$ doubtfully. Right eye, no redness; pupil oval, with long diameter horizontal. Javal shows:

R. E., 3.50 D. ax. $\frac{105^\circ}{15^\circ}$ L. E., 3 D. ax. $\frac{75^\circ}{165^\circ}$

R. E., + 3 c. ax. $105^\circ = \frac{20}{L}$, L. E., - 1.50 c. ax. $165^\circ = \frac{20}{XX}$, and the patient is discharged improved.

December 20, 1898, more than a year after the operation, the patient was seen again. The right eye looks the same; there is no injection; the eye has not become more enlarged or prominent; the pupil is black and oval in shape; there is no pain or tenderness nor has there been since she was discharged a year ago. Vision, R. E. = $\frac{20}{CC}$; + 3 c. ax. $105^\circ = \frac{20}{LXX}$, practically the same as it was upon discharge, making allowance for difference of place and illumination. There is slight ex- and hypophoria. An ophthalmoscopic examination shows the media clear and the choroid and the staphyloma about as media they were a year ago.

This patient seems to me to have been benefited decidedly. In the first place, at the expense of a simple and but slightly painful operation, she has been entirely relieved of the recurring attacks of pain with injection in the right eye, a condition that was greatly incapacitating her and rendering existence more or less miserable at the time she applied for relief. It is impossible, moreover, to foretell to how evil a state, to what pain and loss of time this progressive myopia with recurring ciliary hyperæmia might finally have led. In the second place, the entire relief of the right eye has greatly improved the vision of the left, it has mounted from $\frac{20}{LXX}$ without a glass when first seen in December, 1897, to $\frac{20}{XXX}$ in December, 1898. At the same time, it must be remembered that this failing, irritable and irritating eye has been converted into a quiet and stable one capable of affording a very useful degree of vision should a calamity at any time overwhelm its fellow eye. All of this

tends to confirm the favorable *à priori* opinion I had formed of this operation, and which I expressed in reviewing my first case reported in this Journal (October, 1898, page 313).

CASE II.—E. K., a mulatto girl, 22 years of age, of good general appearance, came to the clinic on March 9, 1897, complaining that she was "very near-sighted." Vision, R. E. = $\frac{5}{60}$, L. E. = $\frac{15}{60}$. Javal's instrument shows in R. E., 2 D. ax. 75° , L. E., 2 D. ax. 90° . R. E., — 16 s. \bigcirc — 2 c. ax. $165^\circ = \frac{20}{60}$, L. E., — 16 s. \bigcirc — 2 c. ax. $180^\circ = \frac{20}{60}$. The Ophthalmoscope shows a pronounced posterior staphyloma in each eye. The removal of the right lens is advised. Patient placed in charge of Dr. E. A. Robin, the first assistant surgeon of this department. March 19. Dr. Robin did, under atropine, a small discission with a Knapp's knife-needle. March 20. No reaction, no pain; lens cataractous; atropine.

April 2, 1897. Lens being rapidly absorbed.

May 5, 1897. Under cocaine, thorough discission with a von Graefe knife. May 7. Eye looks well; atropine freely.

June 9, 1897. Very little cortical remaining; needled thoroughly. Capsule seems to be loose in pupil.

July 3, 1897. Large piece of capsule in pupil hanging over into anterior chamber. Advise its removal. July 6. V., R. E. = $\frac{20}{60}$, with + 2.50 s. = $\frac{20}{100}$; L. E. = $\frac{15}{60}$, with glass = $\frac{20}{60}$. July 16. V., R. E. = $\frac{20}{100}$, and no glass improved. Discharged.

There can be no doubt of the great improvement in this case. An eye affected with progressive myopia and posterior staphyloma, to which a — 16 s. \bigcirc — 2 c. could only give a vision of $\frac{20}{60}$, is in four months' time, by an operation causing neither pain nor the loss of a day from the ordinary avocations, brought up to a vision of $\frac{20}{100}$ without any glass—almost double the vision given by the best possible glass before operation. Moreover, we have every reason to believe that we have removed the causes that were acting to produce a gradual but inevitable loss of sight; does the average extraction of the lens for senile cataract, does iridectomy in glaucoma do more? I believe strongly in the future of this operation, though until it shall be well established that no remote ill effects follow, I should prefer to operate upon one eye. In the three cases upon which I have operated up to this time I have chosen the worse eye of the two.

Here the case of Dr. H. H. Harlan (Atlanta meeting of the American Medical Association, Section on Ophthalmology, [*Jour. Amer. Med. Ass'n.*, June, 1896, p. 184]) should not be forgotten. A woman, 45 years of age, had the misfortune to lose her left eye by progressive myopia. At the age of 13, however, she had had the *good* fortune to have an injury to the right eye, causing traumatic cataract and ultimate absorption of the lens. Thirty-two years afterwards, at the time the vision of the left eye was lost, the sight of the right eye was $^{20}/_L$ without any glass and *there was no fundus trouble apparent*. Would an early operation, asked Dr. Harlan, have saved the left eye also? In the light of this case I mostfirmly believe so.

UNUSUAL CAUSE OF IMPAIRMENT OF VISION.

A mulatto laborer, a large, healthy-looking man, 36 years of age, "got a lick in the right eye about four months ago and has not seen well out of it since." He has small pterygium in each eye and a slight error of refraction, but the vision is $^{20}/_{xv}$ in the left eye and only $^{20}/_{cc}$ in the right eye, and no adequate cause for such reduction of vision can be made out. After the right pupil had been dilated to the maximum with atropine, however, by careful examination with the ophthalmoscope and oblique illumination, the cause is discoverable. A long narrow posterior synechia runs in a slightly oblique direction from the upper margin of the pupil to a point slightly above the center of the pupil. This synechia has undergone much cicatricial condensation and contraction, for its middle portion is quite white. The contraction of this cicatricial band has thrown the central portion of the anterior lens-capsule, over an area about corresponding to the normal undilated pupil, into a number of fine horizontal folds, furrows or wrinkles; so that the patient is compelled to see through a medium resembling the clear but fluted glass often placed in doors or windows through which it is desirable to admit light and at the same time exclude the gaze of the curious. The condition was demonstrated to the satisfaction of all the surgeons about the clinic.

DIFFICULTIES IN EXTRACTION OF A TRAUMATIC CATARACT.

L. B., a mulatto servant-girl, 22 years of age, of good general health and appearance, entered the clinic March 23, 1897

She said that about one year ago she had been struck in the left eye with a bunch of flowers, that since that time the pupil had gradually become white, that it gave the eye a queer appearance and somewhat militated against her in obtaining employment, and that she greatly desired to be relieved. Vision, R. E. = $\frac{20}{xx}$, L. E. = l. p. As the left eye had quite a normal appearance save for the mature cataract in the pupillary area, as the light projection seemed good and the tension normal, I consented to attempt extraction, for the purpose of enlarging the binocular field of vision and for cosmetic reasons, provided I was permitted to make a preliminary iridectomy. This was particularly insisted upon, as I had found the pupil not at all dilatable by repeated instillations of a strong solution of atropine.

On March 24, 1897, therefore, under thorough cocaine anæsthesia, a medium-sized iridectomy was made directly upwards, without accident. In performing the operation I thought that I discovered a circular posterior synechia. March 25. Very marked reaction; ordered atropine once or twice daily (to keep the ciliary muscle quiet), and drops of boric acid, borax, and camphor water instilled every hour.

April 6, 1897. All signs of reaction had disappeared.

June 9, 1897. Extraction of the left lens was undertaken under thorough cocaine anæsthesia. A large smooth incision was made in the corneal margin without difficulty, but on attempting to lacerate the anterior capsule I found no cystotome was capable of penetrating it, nor any other knife-like instrument without dislocating the lens. Moreover, the iris was universally adherent to this toughened capsule, thus affording me the area of the coloboma alone to work in. Confronted with the alternatives of abandoning the operation or of pushing the lens back into the vitreous body by too vigorous efforts to get through its capsule, I made use of DeWecker's scissors. The sharp blade of the instrument was pushed through the capsule and by three snips a triangular piece about the size of the coloboma was cut out; this was then picked out of the anterior chamber with iris forceps. The soft lens was now easily delivered leaving the pupil perfectly clear and black. Atropine was instilled, a firm cotton pad and bandage put on, and the patient sent to bed. The bit of capsule removed was found to be about twice the normal thickness and of so elastic

and resistant a nature as to resume its natural shape and curvature when lying free; it reminded one of a bit of rice- or wheat-hull. June 10. The bandage being removed, the wound was found healed, the injection very moderate. June 11. The eye was doing so well that the patient was allowed to go home. June 22. No injection, the cornea which had been cloudy was clearing nicely. June 28. Practically well. The eye looked quite normal, the disfigurement caused by the white pupil being entirely removed, but the vision was disappointing, fingers could only be counted at about three inches owing to irregular astigmatism and lesions, resulting in optic atrophy, inflicted at the time of the injury.

In regard to my insistence upon preliminary iridectomy in this case, I was influenced by a general principle. My experience has entirely convinced me, as I have stated in this Journal (October, 1898), that this is by far the safest operation. It is certainly the one I should choose for myself were I afflicted with cataract. The coloboma even when but partially covered by the upper lid has not the deleterious effect on vision that we should expect upon purely theoretical considerations. It permits the extraction—the final crucial operation—to be accomplished with great rapidity and with the least amount of manipulation and traumatism to the eye. The healing is usually prompt and entirely uncomplicated by iritis or any more remote untoward sequelæ; the entire absence of bleeding is an advantage and the assured, well-healed coloboma permits rapid and thorough evacuation of all cortical masses and we have seldom to face occlusion or secondary cataract of any density. It has been urged that the patient subjected to preliminary iridectomy shrinks from facing a few weeks later a second and more important operation; such has not been my experience. On the contrary, the imagination of most pictures the ordeal as far more terrible than is the reality; and when assured by a surgeon, in whom they have acquired confidence by his performance of one successful operation, that the painful part (the iridectomy) is all behind them, and that which is to follow is as painless as the trimming of a finger-nail, they mount the table for the final extraction as calmly as one who lies down to quiet slumber—nay, even with eagerness, to be once more restored to sight. Think, too, of the immense advantage we have gained in knowledge, acquired by taking the

first and less important step, of the disposition of the patient, his temperament; docility, possession or lack of self-control; the toleration of the eye or its reaction to surgical interference; the danger, or its absence, of infection from some latent conjunctival or lachrymal trouble, of intra-ocular hæmorrhage; points at which the best of us are liable to be deceived up to the last moment.

That this is true—extraction after preliminary iridectomy is the safest operation—I believe that any fair-minded surgeon can readily convince himself by practicing the method upon a series of cases in the clinic where he has full control of his patients. For it must be admitted that the only draw-back is the semi-occasional loss of some particularly stupid or erratic subject who, in spite of all explanations, expects the iridectomy to improve vision and, disappointed, seeks relief elsewhere. This, however, is much rarer among the intelligent classes of our private clientele. Indeed, the unwarranted rape of a patient upon whom a fellow practitioner has performed a successful preliminary iridectomy should be entirely prevented by professional comity, though not always to be avoided with the migratory hordes that drift about our clinics. To adduce the statistics of some wonderfully skillful and vastly experienced operator and show that he obtains almost unbroken success with even the most difficult of methods is no argument; the question is: What is the safest operation in the great average, all degrees of skill and all possible conditions being considered? To this I believe there can be but one answer: The method with preliminary iridectomy. Now if this be true of ordinary uncomplicated cases, how much more true must it be of complicated cases of traumatic and all pathological cataracts, and how very important in those cases in which one eye has already been destroyed and the unfortunate has but a single chance of restoration to sight. In the latter class it is my invariable practice to prefer the method with preliminary iridectomy.

SKIASCOPE; 1899 MODEL.*

BY J. ELLIS JENNINGS, M.D., ST. LOUIS, MO.,

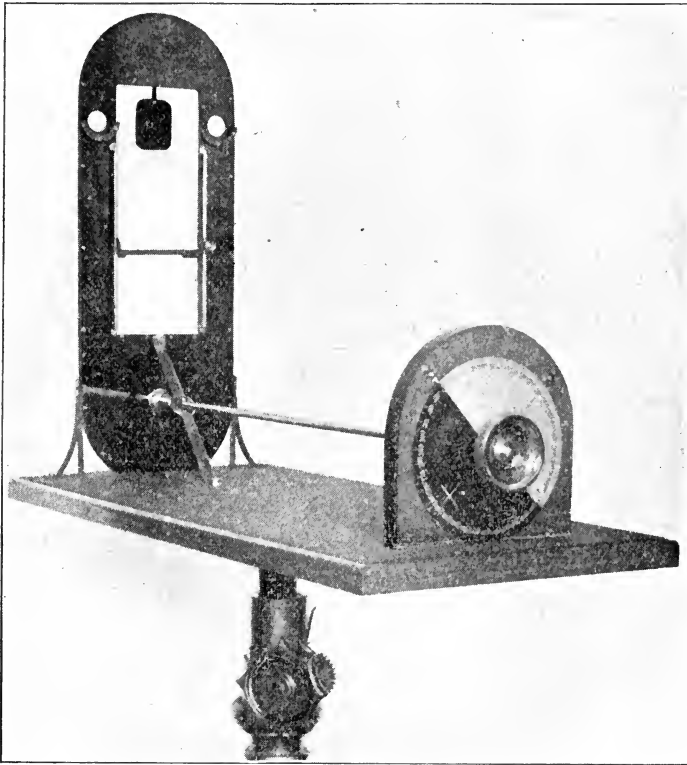
CHIEF SURGEON, EYE DEPARTMENT OF THE ST. LOUIS EYE, EAR, NOSE AND
THROAT HOSPITAL—OPHTHALMIC AND AURAL SURGEON TO THE
ST. LOUIS MULLANPHY HOSPITAL, ETC.

IN the November, 1896, number of THE AMERICAN JOURNAL OF OPTHALMOLOGY, I described and pictured an improved skiascope which was designed to obviate the fatigue and loss of time occasioned by the constant change of lenses from box to trial-frame in practicing retinoscopy. I also had the pleasure of showing the instrument to the members of this Association at St. Louis, in 1897. Since that time it has been used constantly by myself and others in this country and abroad with great satisfaction. The 1899 model of the skiascope, which I now exhibit, is somewhat different from the first model and represents various improvements suggested by practical experience.

It consists of an upright metal frame 18 inches high and 7 inches wide placed at the end of a table $26\frac{1}{2}$ inches long and 12 inches wide. In the upright frame is an endless groove containing thirty-nine lenses and one open cell. At the lower end of the frame is a strong driving-wheel connected with a horizontal rod running the length of the table to a handle with which the operator rotates the lenses. Facing the operator and close to his hand is a large disc on which is indicated the lens presented at the sight-hole. The white numbers on a black ground represent convex and the black numbers on a white ground concave lenses. The lenses range from 0.25 D. to 9 D. plus, and from 0.25 D. to 9 D. minus. The sight-holes are $\frac{7}{8}$ of an inch in diameter placed about 5 inches from the top of the upright frame. In front of each sight-hole is a cell marked in degrees to hold stronger lenses or cylinders. The central portion of the upright is cut away, leaving a space for the face of the patient. A movable blinder is hung from the top while

*Read at the Fourth Annual Meeting of the Western Ophthalmological and Oto-Laryngological Association, held at New Orleans, La., February 10-11, 1899.

the chin-rest moves up and down on two upright parallel rods and is held in place by a thumb screw. The whole is mounted on a strong adjustable stand, which is raised or lowered by means of a rack and pinion.



The essential advantages of this skiascope are as follows :

1. It saves time and fatigue in changing lenses.
2. It is under the *direct control* of the *operator* and indicates the lens in front of the sight-hole without his getting up.
3. The mechanism is simple, durable and easy to operate.
4. The cornea is accurately centered and the lens perpendicular to the eye (a very important consideration and one not possible with a trial-frame).
5. The instrument is of such a length that the distance of surgeon from patient is always one meter.

URIC ACID AS A FACTOR IN THE CAUSATION
OF CHORIOIDITIS.*

BY RANDOLPH BRUNSON, M.D., HOT SPRINGS, ARK.

I N all my reading and research in this connection I have been greatly impressed with the dearth of written knowledge upon this subject, so I concluded to present to this Association a short paper embodying my experience with this class of cases. Perhaps there is no place in the entire country where the ophthalmologist will see so many cases of chorioiditis, iritis, etc., as may be seen at Hot Springs, Ark., where patients come from every quarter of the globe. It has been a routine practice in every case of chorioiditis to first begin treatment with mercury and the iodides in conjunction with the hot baths. A few years ago, after repeated failures to obtain the anticipated results from such treatment, it occurred to me that there must be some common pathologic factor other than syphilis to cause this disease, and I began to investigate closely and changed my method of treatment, especially in those obscure cases where no positive diagnosis of syphilis could be made, and as a result my efforts towards a cure were in many cases rewarded by a clearing up of the trouble by the use of the salicylates, after the patient had been given, without effect, either by myself or the gentleman who had referred the patient to me, a thorough course of anti-syphilitic treatment. If we will bear in mind the close anatomic relationship between the chorioid and iris, will we be surprised to know that uric acid, if it causes a disturbance in the latter, why it should not in the former?

The second tunic of the eye is formed by the chorioid behind, the iris and ciliary processes in front. The chorioid is the vascular and pigmentary tunic of the eyeball investing the posterior five-sixths of the globe and extending as far forward as the cornea. The middle layer consists of an exceedingly fine capillary plexus formed by the short ciliary vessels. About

* Read at the Fourth Annual Meeting of the Western Ophthalmological and Oto-Laryngological Association, held at New Orleans, La., February 10-11, 1899.

half an inch behind the cornea its meshes become larger and are continuous with those of the ciliary process. The ciliary processes are formed by the plating and folding inwards of the middle and internal layers of the chorioid at its anterior margin and are received between corresponding foldings of the suspensory ligament of the lens, thus establishing a communication between the chorioid and inner tunic of the eye, the larger processes at their periphery being attached to the ciliary ligament, and with the middle and inner layers of the chorioid, their anterior surface is turned towards the back of the iris with the circumference of which it is continuous. The capillary network of the chorioid is the finest and closest in the body. The total area of these capillaries is at least eight hundred times greater than that of the short posterior ciliary arteries from which they arise. In consequence of the law that the velocity of a current in a tube is inverse to its lumen, the velocity of their capillary current must be very many times less than that of the short posterior ciliary arteries. The chorioid presents another peculiar feature, its vessels are arranged in super imposed layers progressively diminishing in size from without inward. In the profound chronic toxæmias, produced by uric acid, the earliest manifestations of the long series of necrobiotic changes are found in the arterioles and capillaries. Here the blood-current is slower than elsewhere and the blood charged with toxic substances is in contact with the delicate structure of these minute vessels much longer than in the larger arteries and veins. Haig, in his admirable work on uric acid, claims that, "if uric acid affects the arteries in the way and to the extent to which it does, it must influence for good or evil the function, nutrition and structure of every tissue and organ of the body from the skin outside to the most central fibers of the spinal cord and brain within."

Free uric acid in the blood does cause contraction of the arterioles, and by this interference with interstitial circulation becomes the prime factor in pathologic changes in every tissue and organ in the body.

Mr. Stanford Morton relates (*Ophthalmic Review*, March, 1890) that he "saw stasis or thrombosis in the vessels of the retina in one or two cases, taking place during an attack of migraine, and there is every probability that these troubles were due to uric acid," and if this can take place in the retina,

why not in the chorioid? Haig sums up one of his brilliant theses as follows: "If my premises are good and my deductions sound, and if uric acid really influences the circulation to the extent which I have been led to believe that it does, it follows that uric acid really dominates the function, nutrition and structures of the human body to an extent which has never yet been dreamed of in our philosophy; and in place of affecting the structure of a few comparatively insignificant fibrous tissues in which it is found after death, it may direct the development, life history, and final decay and dissolution of every tissue from the most important nerve-centers and the most active glands to the matrix of the nails and the structure of the skin and hair."

In many cases we have associated with chorioiditis of this form typical symptoms of rheumatic iritis also; again, we have the one without the other complication, and upon close observation we find that if the patient has the explosion of uric acid in other parts of the body, the choroid and iris are comparatively free from this trouble until these symptoms have subsided, when we have a recurrent attack of chorioiditis or iritis, or both at the same time. It is not necessarily the case that a well-defined history of rheumatism may be found in order to make the proper diagnosis of the case. If we can discover even any remote symptoms of uric acid after we have eliminated other causes by exclusion, it will guide us in obtaining the line of treatment necessary to perfect a cure.

It frequently happens that no assignable cause can be found for the condition existing in the choroid, the patient does not give a history of rheumatism, yet if uric acid be found and everything else has been due to eradicate this condition of the chorioid and the salicylates are at last administered, the inflammatory process subsides like magic. The changes in the fundus of the eye may be entirely confined to one eye, or may effect both, and be evenly distributed all over the fundus, or confined to a limited area. The uveal pigment and bacillary layer of the overlying retina may become affected also, and hence the term chorio-retinitis is often a more suitable name than simple chorioiditis. Patches of atrophy appear as rounded areas from one-fourth to one disk's diameter, or a little larger, bounded by a ring of black pigment, the entire surface within this ring is white or bluish-white and glistening and shows no

trace of chorioidal vessels or pigment. The appearance of the fundus between the atrophic spots is usually normal. In other places we find similar patches showing very small splashes of pigment on the exposed sclerotic; in other patches again are seen the chorioidal vessels unchanged, or with partial or complete obliteration of the blood streams, from endarteritis, appearing as white or yellowish-white strands. At the diseased spots the outer layers of the retina are always more or less infiltrated with the pigment. These foci of inflammation just as in any other form of the disease, leave the atrophic spots, and thereby interfere with perfect vision. We find on examination of the urine from day to day an increase of uric acid excreted under the influence of the salicylates, hot baths, and a vegetarian diet. It is not necessary to probably weary you with the line of treatment in detail for this class of patients, as any drug which will increase the solubility of uric acid will eliminate the disease through the excretory organs.

I can not refrain, however, from extolling the benefits to be derived from the hot water treatment as given at the Hot Springs of Arkansas in conjunction with other remedies, as in many cases this will alone bring about a decided improvement without the aid of the salicylates. This assertion is founded upon facts. I will close by admonishing you to carefully examine the urine in these puzzling cases of chorioiditis to find the relative proportion of uric acid to urea; and if you do not find it to be 1 to 33 or thereabouts, it will show that the uric acid is not being properly eliminated and in all probability is the cause of the chorioiditis.

A UNIQUE POINT IN REMOVING THE SOFT LENS-MATTER FROM THE CAPSULE IN AN UNRIPE OR OVERRIPE LENS.

BY C. W. CRUMB, M.D., UTICA, N. Y.

A NUMBER of methods have been devised to remove the soft *débris*, after extracting the hard part of the lens, as for instance, washing out the anterior chamber and lens-capsule, but none has yet proven entirely satisfactory. My objections

to this method are that even with a perfectly aseptic solution it introduces a foreign substance and a certain pressure is exerted on all of the tunics of the eye which one can not well regulate or control. Furthermore, it is attended with some pain, and consumes time, which is important when one is operating with cocaine anæsthesia.

Another method is to leave the soft cortical matter that can not be removed by the scoop or spoon until it becomes opaque, then do the secondary operation of needling. If possible, this secondary operation is to be avoided, and, in my opinion, can be, if the following steps are taken, which I have used in a number of cases with marked success. Let me illustrate by a recent case:

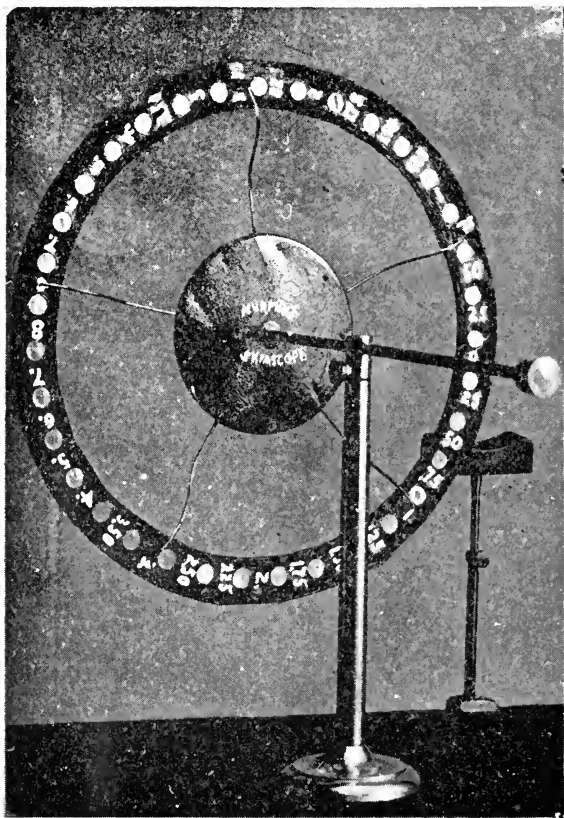
Mrs. M., aged 63 years. Right eye, lens opaque, perception of light only; left eye, lens becoming opaque, counts fingers. Has been in this condition for nearly three years. I sterilized the right eye and extracted the lens by the combined operation. After a linear incision and iridectomy had been made, on opening the lens-capsule the soft lens-matter began to ooze out. Now, instead of pressing on the edge of the wound, tilting the hard part of the lens and expressing it, I simply pressed down on the hard center of the lens-substance, and by so doing displaced the soft lens-matter from the bottom of lens-capsule where it naturally gravitates, so that it had to escape through the opening made in the lens-capsule to remove the lens, and by a series of such of pressures on the hard nucleus I expressed all of the soft lens-substance. Then only I pressed in the usual way on the edge of the incision and with the spoon tilted the hard nucleus and expressed it. This left a clean pupil which has remained clean for several weeks, and I see no reason why it should not continue so indefinitely.

The point I wish to emphasize is that instead of keeping the patients with senile cataracts waiting for years in blindness we can, if the above steps are taken in operating, operate much earlier, for it is in removing the soft lens-matter that the operator experiences the greatest difficulty, and we can realize much better results by expressing the soft lens-matter first, than if we leave it, and try to get a clear pupil afterwards, as is the usual custom.

A NEW SKIASCOPE.

BY F. G. MURPHY, M.D., KANSAS CITY, MO.

SKIASCOPY is generally recognized as being the most accurate method of estimating errors of refraction, though the various kinds of instruments now in use are not free from a few objections.



The hand skiascopes are inconvenient on account of the time required and the difficulty experienced in teaching the patient to properly manipulate them, and for the physician to hold them in position is not satisfactory. The circular skiascopes have been expensive and have the following objections: The inability of the surgeon to readily adjust the instrument

to the slight movements of the patient's eye from the center of the lens, and either moving the patient from one side of the skiascope to the other, or moving the entire instrument to the other side of the patient in examining each eye.

These two objections to the circular skiascopes have been eliminated in this instrument, the photograph of which is here presented. The revolving disk, 22 inches in diameter containing thirty-four lenses, is placed at the end of a horizontal rod which rests on a fulcrum and enables the operator to move the lens in front of the patient's eye in any direction.

The second advantage is, that the instrument is close to the eye when either one is being examined and the instrument does not interfere with the light being placed on either side of the patient's head.

There are seventeen minus and seventeen plus lenses and one marked 0 which contains no lens. Starting with the opening which contains no glass the plus lenses are brought in front of the eye by revolving the disk towards the patient. The minus lenses start from the same point and are distributed in the opposite direction and are brought in front of the eye by turning the disk from the patient.

The skiascope can be raised from twelve to fourteen inches and when once in place can be tilted up and down by pressing down and raising the handle-bar. This movement with the lateral one enables the operator to keep the lens in front of the patient's eye no matter how much he may move about, and also when the lens reflects the light from the mirror the physician can readily change the angle with his left hand which is kept on the handle-bar.

The third improvement is in the chin-rest. The telescope rod has on its lower end a stud and spring which keeps the chin-rest from falling where the set-screw is loosened, and the chin-rest remains in position until the set-screw is made to hold it more firmly for the heavier pressure to be put upon it by the chin. It relieves the operator of the necessity of getting up to adjust the chin-rest or from the awkward attempt to adjust it by leaning over the table with both arms, with the instrument on the table. This device is equally as convenient for the chin-rest of the ophthalmometer.

The instrument is manufactured by Chambers, Inskeep & Co., Manufacturing Opticians, 146 State Street, Chicago.

KERATITIS HERPETICA.*

BY S. L. LEDBETTER, M.D., BIRMINGHAM, ALA.

BEGINNING with the older writers, Soëllberg-Wells places all superficial ulcerations under one general head, *e. g.*, "keratitis superficialis." He does not use the word "herpetic" at all. Stellwag devotes more space to "herpetic keratitis" than any other writer, and includes phlyctænular keratitis under that head. He is the only author on my book-shelves who mentions specially an herpetic eruption extending around the circumference of the cornea, a condition most frequently seen in scrofulous persons, or persons suffering from nasal catarrh with eczematous or impetigenous eruptions about the nasal orifices. These, to me, seem the most typical of herpetic troubles, but being on the conjunctival margin, they might be omitted from the list of corneal troubles. They are of short duration and require but little treatment. Juler and Nettleship mention herpes as synonyms of phlyctænule, while DeSchweinitz treats the two as distinct types. Fick treats, at some length, on herpetic keratitis and herpes dendriticus, making the dendritic ulcer a later development of the herpetic vesicle, and hence pathologically the same. If these superficial ulcers, which are classed by different authorities as phlyctænules, superficial corneal ulcers, herpes, and dendritic ulcer, be of the same class and bacteriologically the same, there are clinical differences which would make different types.

I will report three cases which I think illustrate three distinct types:

CASE I.—Mr. W., an attorney, 48 years of age, a man of temperate habits, robust, vigorous constitution, but a hard worker, came to me complaining of a sensation as of something in one of his eyes, with photophobia and excessive lachrymation. There was some conjunctival injection, not much, however, and a small line of infiltrated tissue. A portion looked rough and abraded, while the extremities presented a vesicular appearance. The abrasion resembled that from a slight or superficial wound. The ulceration spread

* Prepared for the Fourth Annual Meeting of the Western Ophthalmological and Oto-Laryngological Association, held at New Orleans, La., February 10-11, 1899.

slowly, branching off irregularly. While the older portions were healing new vesicles were forming and in turn breaking down. There was a typical dendritic ulcer, and, according to Fick, this would be classed as a vesicular, or herpetic keratitis. The patient was very much run down before a cure was obtained, but there was at no time a febrile condition. Various local remedies were used, with tonic and antiperiodic remedies internally. Nothing seemed to avail anything except curetting and antiseptic washes. The eye recovered after six or seven weeks of constant treatment.

CASE II.—Male, white, 21 years of age; a mechanic who had not been in first class condition, though apparently strong and robust; had a small corneal ulcer about one-sixteenth of an inch in diameter, quite superficial, which had been in existence several days. The surface was covered by a loose layer of dead tissue when I saw the eye first, something like the appearance from a shallow blister. This was easily removed with a spud. A prescription was given, and the patient was not seen any more for more than a week. The patient said he had gotten along well until the last day or two, when he began having trouble again. I found that the eye was quite irritable, the edges of the ulcer looked rough, and there was another layer of dead tissue on its surface which I curetted away. The eye did well for a while again, and then began to develop small points of infiltration like minute phlyctænules around the border of the original ulcer. This kept up at regular intervals for a number of weeks, the eye always feeling well for several days after curetting and treating one of these little points. Then the photophobia would start up again, and another point would show itself. This condition lasted nearly three months all told, and nothing seemed to do any good except curetting and antiseptic washes, though quite a number of remedies were tried, including tonics and antiperiodics. The patient never had any fever during the course of the trouble. There was but little conjunctival injection at any time, and but little pain.

CASE III.—Male, white, 38 years of age; a coal-miner, with, apparently, a good strong constitution. There was no history of malaria or fever of any kind. The patient had a slight catarrhal affection; there were two or three little irregular looking abrasions coming down from the upper margin of the cornea. At the end of each abrasion there was a small infiltrated point or vesicle. These were curetted and treated. A week later, when the patient came again, the irregular

ulcerations had extended somewhat, branching out like twigs on a limb. At the end of each little furrow was attached a small tab of mucus. There were three or four of these. I thought they were little flakes of loose mucus, but they would not wash away. Each one was attached to the surface of the ulcer by a small pedicle, like so many mucous polyps. The eye was quite sensitive, but after the infiltrated points were curetted and treated, the pain disappeared. The ulcerations lasted about seven or eight weeks altogether. The little polyps had to be removed several different times. The furrows coming from the ulcerated surface, and the nebulous scars which followed, were like those in Case I, but extended differently. From a small area of infected tissue at the upper margin, the disease extended downward, widening as it spread, taking in a triangular-shaped area of the cornea.

These cases present many symptoms in common. They were all superficial, never getting beyond the outer layer of the cornea. They were slow in developing and slow in recovering. There was but little conjunctival injection, no triangular-shaped group of vessels, as is characteristic of phlyctænules, but the photophobia and lachrymation were considerable. There was no history of fever in any of the cases. They all occurred in men who were robust, but at the time of development perhaps not just up to the normal.

Case I answered perfectly the description by DeSchweinitz of keratitis dendritica.

Case II was like DeSchweinitz's description of herpes febrilis.

Case III was more like Case I, being in some points quite different however.

To sum up: Are all dendritic ulcers herpetic? Are all phlyctænules herpetic? Are all superficial ulcers pathologically the same? If they are, there are several different types of the same form of ulcer. I have never seen any of them follow an intermittent fever, as is so common in herpes labialis.

Phlyctænules I find quite common among children with tubercular tendencies. The herpetic eruption around the corneal margin, as described by Stellwag, I find in connection with a form of nasal catarrh.

Cases like these reported by me in this paper are rare in this section, have not been traceable to any constitutional dyscrasia, have not responded readily to constitutional remedies, and to nothing but radical local measures.

MEDICAL SOCIETIES.

PROCEEDINGS OF THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

H. R. SWANZY, F.R.C.S.I., President, in the Chair.

THURSDAY, JANUARY 26, 1899.

RAPID CHANGES IN REFRACTION IN CONNECTION WITH DIABETES.

MR. H. GRINSDALE read this paper. A female, aged about 45 years, was first seen on October 7, 1897. She had been always thin and delicate, and had been losing flesh. She had been wearing for near vision R. sph. + 1 D. \ominus cyl. + 2.75 D.; L. sph. + 1.75 D. She had suddenly noticed a change in the power of her sight a few days before her visit; distant objects became dim and near objects became clearer. When seen V. was:

R., $\frac{6}{LX}$ with — 2 D. sph. \ominus — 0.5 D. cyl., $\frac{6}{VI}$;

L., $\frac{6}{LX}$ with — 2 D. sph., $\frac{6}{VI}$.

Result confirmed by shadow test. In the R. lens there were several opacities near the center; the L. lens was clear, but the nucleus in each was marked. No other defect in eyes found. The condition was regarded as early sclerosis of the lens, and glasses for distance were ordered. Dr. Stokes had shortly before discovered a large amount of sugar in her urine (26 gr. to the ounce). The urine had been frequently examined in previous years, and had contained no sugar. After ten days the vision had returned to its former condition, R. $\frac{6}{XVIII}$ w. — 0.5 D. $\frac{6}{XII}$; L. $\frac{6}{VI}$. The right lens showed irregular astigmatism, but the opacities were unaltered. About three weeks later the patient died with diabetic coma. The interest of the case lay in the development of myopia and its rapid disappearance. A similar case was reported by Risley ("Trans. Amer. Ophth. Soc.," 1897), in which disappearance of sugar in dia-

betes was accompanied by development of hyperopia, followed by a return to normal when the sugar reappeared. The case was probably a lenticular one; it was impossible to assume an alteration in position of the retina; it was not likely to be due to spasm of ciliary muscle, as this would have involved a permanent spasm in Risley's case, suddenly giving way and then reappearing.

Mr. DOYNE quoted the case of a diabetic man, aged 43 years, whose vision and refraction were $H\ 3\ D. V. = \frac{6}{VI}$. After a voyage vision was $\frac{6}{XII}$, with $+2\ D. \frac{6}{VI}$. The sugar then disappeared under treatment, and vision was emmetropic or $H. 0.5$.

ON THE STEREOSCOPIC EXAMINATION OF SKIAGRAPHS OF FOREIGN BODIES IN THE EYE AND ORBIT.

Mr. MACKENZIE DAVIDSON gave a demonstration of the most recent changes and developments he had made in his method of investigating the presence and position of foreign bodies in the orbit and eyeball. Two negatives were taken, the light being changed in position about 6 cm., the interocular distance. If these were examined side by side against a window, with a little practice in converging the eyes, a miniature stereoscopic picture started into vivid relief, and a fairly accurate estimate could be made of the situation of the foreign body in relation to a known point, such as a piece of lead wire attached to the lower eyelid. The best instrument for seeing stereoscopic skiagraphs was Wheatstone's reflecting stereoscope. If the stereographs were reversed the object, still stood out in perfect relief, but it appeared to be in the other eye; this would not give rise to any confusion, as it would always be known in which eye the foreign body was lying. Mr. Mackenzie Davidson had applied this method of localizing foreign bodies in the eye in seventy cases, and he claimed for it an indispensable position in ophthalmic practice.

Mr. SILCOCK spoke of a case in which a foreign body had passed through the cornea and lens, and was located by Mr. Mackenzie Davidson about 6 mm. from the O. D. Under an anæsthetic an incision was made through the sclerotic and the magnet introduced close to the foreign body, which was withdrawn.

MESSRS. ADAMS FROST, JOHNSON, TAYLOR, and CARGILL spoke of cases under their care.

CARD SPECIMENS.

MR. J. HERN—Obstinate Conjunctivitis.

MR D. C. LLOYD OWEN—The Cartella Eye Shield.

MR. W. H. JESSOP—Skiagraph of Foreign Body in Eye.

MR. JOHN GRIFFITH—Microscopical Specimen of Primary Sarcoma of the Cornea.

MAJOR M. T. YARR, R.A.M.C.—Patch of Central Choroid-Retinitis Simulating in appearance the Optic Disc.

MR. C. HIGGENS—Case of Removal of Lens for High Myopia.

MR. E. C FISCHER—Associated movement of Lid and Jaw.

MR. A. BRONNER—(1) Congenital Tumor of Cornea; Degenerated Nævoid Growth?; (2) Tuberculous Tumor of Iris. —(*British Medical Journal*).

NEWS ITEMS.

Dr. H. V. Würdemann, of Milwaukee, who has been associate editor of the *Annals of Ophthalmology* in charge of the department of German literature, has accepted the position of editor-in chief, vice Dr. Casey A Wood, of Chicago, resigned. Dr. Wood will retain an interest in the *Annals of Ophthalmology* and will remain in charge of the department of Italian literature.

The staff of the *Annals of Ophthalmology* will shortly be enlarged by the appointment of six collaborators. Abstracts of Dutch, Russian, Scandinavian, Polish and Grecian literature will be hereafter included. With these the abstract departments of the journal will cover the ophthalmic literature of all the world. Book reviews and abstracts of foreign literature have generally appeared in the *Annals* several months in advance of other publications, even of journals of foreign countries where the originals were published. The abstract departments are a very valuable feature of the *Annals*, as references to all up-to-date literature are here collated. Hereafter only original papers of first importance or of the most exhaustive type will be accepted for publication in the *Annals of Ophthalmology*.

OBITUARY.

THE LATE DR. WILLIAM H. BAKER.

RESOLUTIONS OF RESPECT TO HIS MEMORY.

At the fourth annual meeting of the Western Ophthalmological and Oto-Laryngological Association, held in New Orleans, La., February 10 and 11, 1899, the following resolutions were passed:

This Association has heard, with profound regret, of the sudden and unexpected death of Dr. William H. Baker, of Lynchburg, Va., an active member of this Association. In 1897 he attended the meeting in St. Louis, and read a paper entitled, "Mental Depression and Prolonged Melancholia Following Graduated Tenotomy and the Limitation of Prisms." He had promised a paper to be read at this meeting. Notwithstanding the constant and pressing engagements of extensive practice, he traveled far to attend these meetings, and was a frequent participant in the discussions.

Dr. Baker was born in Winchester, September 16, 1857. He attended Roanoke College at Salem, from which he graduated, and which not long since conferred upon him the degree of A. M. He pursued his studies in medicine at the University of Maryland, and Johns Hopkins University, and the special studies of the eye, ear and throat with Dr. Julian J. Chisolm, of Baltimore. He had recently returned from Europe where he had been studying and observing clinics. He brought to the active practice of medicine a splendid and valuable store of knowledge, measureless industry and boundless energy, qualities which soon won for him the confidence and esteem of every one who came within the sphere of his influence. Doctors in Lynchburg, collectively and individually, regarded his residence there as of inestimable value to their practice and of utmost importance to the people, for it was generally appreciated that where Dr. Baker practiced no necessity existed for patients to go to distant place to have special treatment.

It was not alone in his work as a physician that Dr. Baker won the favor and esteem of the people in Lynchburg. In social, religious and literary life of the city he was at all times a useful and important factor. His traits of character rendered him distinctly aggressive and progressive. In the school board of which he had been for several years a valued member, he occupied a prominent position, seeking in every way he could to elevate and broaden the educational work of the free-school system. Dr. Baker had resided in Lynchburg for about fifteen years. He married Miss Eliza Deane, who survives him with two children, a daughter and a son.

Being therefore desirous of expressing and placing on record our sense of the calamity which has fallen upon us in the loss of our distinguished friend :

Resolved, That the name of William H. Baker will ever be identified with the Association as one of its early members and most interested supporters.

Resolved, That in the death of our lamented brother the medical profession has lost a most able, eminent and loyal member, and his community a public support and most reliable citizen, and society one of its highest types of moral character.

Resolved, That words are inadequate to express our sorrow, that we can no longer in this work enjoy his professional companionship, and profit by his counsels.

Resolved, That we sympathize most deeply with the family of our late member in the bereavement with which it has pleased Divine Providence to afflict them.

Resolved, That a copy of these resolutions be sent to the family.

W. E. DRIVER, M.D.,	} Committee.
ADOLF ALT, M.D.,	
B. E. FRYER, M.D.,	

PAMPHLETS RECEIVED.

"Surgery of the Lung," by J. B. Murphy, M.D.

"Cylindrical Transposition," by N. B. Jenkins, M.D.

"Annual Report of the Lutheran Hospital," St. Louis, Mo.

"The Serum Treatment of Diphtheria," by W. Cheatham, M.D.

"Clinical Report From the Winyah Sanitarium," by K. von Ruck, M.D.

"The Human Eye a Defective Optical Instrument," by A. R. Baker, M.D.

"The Teaching of Physiology in Medical Schools," by W. T. Porter, M.D.

"The Use of Nosophene and Antinosine in Surgery," by C. A. Dundore, M.D.

"The Treatment of Chronic Suppurative Otitis Media," by N. H. Pierce, M.D.

"Schott Treatment of Chronic Heart Disease," by Elsworth Smith, Jr., M.D.

"Surgery in Obstinate Neuralgia of the Mastoid Region," by Robert Sattler, M.D.

"Mastoidectomy, Involving Lateral Sinus Complications," by J. O. Stillson, M.D.

"Thirtieth Annual Report of the Brooklyn Eye and Ear Hospital." January, 1899.

"Antinosine in the Treatment of Diseases of the Eye and Ear," by W. F. Coleman, M.D.

"Seventy-Third Annual Report of the Massachusetts Charitable Eye and Ear Infirmary."

"Holocain in Ophthalmic Surgery; Its Superiority Over Cocaine; Its Therapeutic Value," by Hasket Derby, M.D.

"Bilateral Paralysis of the Posterior Cricoarytoid Muscles of the Larynx, With Report of a Case," by A. R. Baker, M.D.

"Protargol as a Substitute for Nitrate of Silver in Ophthalmia Neonatorum and Other Conjunctival Diseases," by F. E. Cheney, M.D.

"A Case of Acute Mastoiditis; Perforation of the Medial Plate of the Process and Consecutive Abscess in the Neck," by Ch. H. Burnett, M.D.

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ORIGINAL ARTICLES.

SIMPLE GLAUCOMA IN A GIRL SIXTEEN YEARS
OF AGE; OPERATION: IRIDECTOMY;
FAVORABLE RESULT.*

BY S. C. AYRES, M.D., CINCINNATI, OHIO.

GLAUCOMA is essentially a disease of middle life. Priestley Smith, in his exhaustive analysis of 1000 cases, finds that of these 293 occurred between 50 and 60, and 290 between 60 and 70, showing that about 58 per cent. occurred during those two decades, and but 9 per cent. between 70 and 80, and 20 per cent. between 40 and 50. Under 20 the liability of glaucoma is only about one-half of one per cent.

There are certain symptoms of this dreaded disease which can be easily recognized. In the acute cases we have the hazy cornea, the dilated pupil, the increased intra-ocular tension, the severe neuralgic pain, and the impaired vision. In the simple cases we have the dilated pupil, the increased tension, the contracted visual field, the deep excavation of the optic discs, the pulsating central retinal artery, and the gradual failure of vision and blanching of the optic nerves.

Volumes have been written to show why this disease occurs more frequently in middle life and advanced years. Priestley Smith has shown that the lens increases perceptibly as we advance in years and on this has proposed a theory that the enlarged lens presses on the lymph-channels in such a way

*Read before the Academy of Medicine of Cincinnati, Ohio.

as to interfere with the normal intra-ocular circulation. The corneal diameter, the refraction of the eye, the condition of the sclera, the blood vessels of the internal ocular tissues, and many other points have all been most carefully studied and commented upon, and every effort has been made to find the cause of this dangerous disease. It is not my object now to discuss these interesting points but simply to recite the history of a case which is rather unusual—a case of glaucoma occurring in a girl 16 years of age. It is a case in which the subjective and objective symptoms of this disease were as plainly marked as if she were 60 instead of 16 years of age.

Priestley Smith, in his Erasmus Wilson Lecture on Glaucoma, says that "the liability to primary glaucoma is extremely slight in childhood and youth as compared with the later periods of life"; thus at 15 years of age it is at least one hundred times smaller than at 65. In the 1000 cases tabulated by him the liability to glaucoma was only one-half of one per cent. under 20 years of age. The literature on the subject contains numerous reports of glaucoma under 20 years of age, a few of which I quote:

Dr. Randolph, of Baltimore, reports a case of glaucoma simplex in a mulatto girl, 11 years of age. It presented all the symptoms characteristic of this disease in advanced life.

Dr. Harlan, of Philadelphia, observed a very remarkable case of hereditary glaucoma in a family. His patient was 18 years of age, and her mother had lost her sight from the same disease at the age of 19, and the maternal grandfather at the age of 18. The great-grandmother on the mother's side, and the great-great-grandfather also became blind from the same cause. This disease occurred also in early life in members of the collateral branches of the same family.

Gallenga, of Turin, published in 1886, an exhaustive clinical report of 332 cases of glaucoma, treated at the clinic of Turin. Among these, two cases occurred in persons between the ages of 10 and 19 years.

Nettleship, in "R. L. O. H.," Vol. XII, reports four cases in persons under 20 years of age.

Brailey, in the "Transactions of the Ophthalmological Society of Great Britain," 1890, reports a case in a girl, 18 years of age.

Story (*Ophthalmic Review*, Vol. XII) reports a case in a girl, 18 years of age.

Schmidt-Rimpler, in the Graefe-Saemisch Handbuch, reports a case in a girl, 9 years of age (Stellwag), a boy of 12 (Schirmer), and a boy of 16 and one of 19 by Mooren.

A few years ago I saw a girl, 18 years of age, in the St. Mary's Hospital of this city, who had chronic glaucoma in both eyes. The tension was increased, and there was a deep excavation of the optic discs, the pupils were moderately dilated, the fields were contracted, and in fact the eyes presented all the subjective and objective symptoms of glaucoma as seen in advanced years. She was highly myopic and had worn glasses for several years. The dangers of the disease were fully explained and the operation of iridectomy proposed, but to this her parents would not consent, and she left the hospital.

This case, with the one I am about to report in detail, are the only ones I have seen in person under 20 years of age.

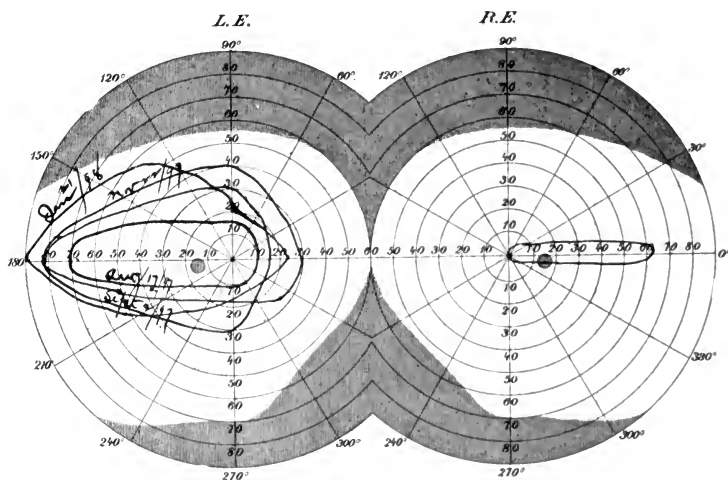
My case is as follows: Miss C., 16 years of age, was first seen by me August 17, 1897. She is a bright, healthy, well-developed girl. Her parents are both living and have good eyes, and there is no history of glaucoma in the family. She stated that two years previously the right eye began to have attacks of dimness which at first passed off without impairing the sight, but that gradually vision failed, until now the eye is almost blind. Recently the vision of the left eye has failed and she fears it may go as the right one did.

The eyes are well developed, corneæ of normal diameter, and irides healthy in appearance. The pupils are moderately dilated, the right one not responsive to light and the left one responds very sluggishly. Tension of each eye is +1. In the right eye the optic disc is deeply excavated and blanched, vision is only equal to shadows of the hand.

The optic disc of the left eye is also deeply excavated but presents a fairly healthy appearance, vision = 0.4, with M. 1 D. \odot Am. $0.75^\circ + 90$, V. = 0.9. The field of vision of the right eye is reduced to a narrow streak or line running horizontally. It is about 60° long and 10° wide and entirely on the temporal side. The field of the left eye is considerably larger, being about 10° in the nasal side and 70° in the temporal side and

about 30° in width. A solution of salicylate of eserine gr. $\frac{1}{6}$ ad ℥ss was ordered to be instilled twice a day.

She was next seen September 7, when a considerable improvement was marked. With the right eye she could count fingers at $3'$ and with the left eye $V. = 1$ with full correction. The eserine had a happy effect on the eyes and the tension was reduced to almost normal. The field of vision of the right eye was not enlarged but that of the left had expanded considerably as is shown by the diagram. She was directed to continue the use of the eserine as before and to abstain from all use of her eye.



On November 22, the field of the left eye had broadened out still more on both temporal and nasal sides, as well as in the upper and lower fields. The right eye was about the same, no improvement being noted.

January 8, 1898. Eyes about the same. On January 21, the right eye was reduced to perception of shadows, and with the left eye she had a vision of only 0.8, a marked failure in vision since her last visit. The eyes were feeling uncomfortable but not painful. Pain as a symptom had been quite absent from the first, but now she was aware that her left eye was more clouded and hazy than it ever had been.

I had used the eserine up to this time, as the field of the left eye had gradually enlarged and the tension was held down about to the normal point. But now a change was apparent.

The field of the left eye had begun to contract and the eye was in an uncomfortable condition. Feeling that the eserine had accomplished all that it could and fearing to treat it longer I proposed operation of iridectomy, to which a ready assent was given.

On January 21, 1898, under chloroform anæsthesia, I made an iridectomy upward in each eye. The operation was not attended by any unusual complications. The iris was found thick, fleshy and adherent to the iris-angle. The next day the eyes were free from reaction but the anterior chambers were both empty. The incisions did not fully close until January 28, seven days after the operation. Eyes were sensitive to light but vision fairly good.

February 7. A small cystoid cicatrix has formed in each incision. Eyes still sensitive to light but otherwise comfortable. Tension normal in both and vision in the left eye very satisfactory, but no test was made with her glasses.

She returned home and was again seen March 8. The right eye was still slightly sensitive to light but the left one was free from any irritation. Tension of the right eye was about normal with a suspicion of a tendency to plus tension, left eye tension normal. The vision of this eye with M. 3 D. \ominus Am. 1 D. ax. 90 V. = 0.8.

April 9. M. 4 D. V. = 0.9.

May 18. M. 2.5 \ominus Am. 1 D. ax. 20 V. = 1.

September 17. V. = 0.9 with the same lenses.

This record of her refraction shows the changes which took place after the operation. Her myopia was first 3 D., then 4 D., and finally 2.5 D., where it now stands. The myopic astigmatism increased only from 0.75 to 1 D., but the angle changed from 90° to 20°. If she had been seen earlier it is very probable that the right eye might have been saved also.

The occurrence of glaucoma in a girl 16 years of age conflicts somewhat with the theories which explain its manifestations so well in middle life, but that it does occur is certain.

INTRA-OCULAR HÆMORRHAGE SUBSEQUENT TO
CATARACT EXTRACTION AND IRIDECTOMY.

BY J. S. JOHNSON, M.D., ANN ARBOR, MICH.

STIMULATED by Dr. B. E. Fryer's article in the February, 1899, number of this Journal, and with the desire to contribute to more complete statistics of post-operative intra-ocular hæmorrhage, I will report two cases which have recently occurred under my observation in the clinics of the Michigan University Hospital.

CASE I.—Mr. E. W., 71 years of age, American, came to the hospital November 28, 1897, with a mature senile cataract in his right eye. Vision in the eye began to fail four years before and the history of the development was entirely devoid of anything unusual. He had never had any pain, light perception and projection was good, and the eye appeared in every respect normal and healthy and a favorable one for operation. After the usual preparation of the patient, the operation was performed November 29, at 2 P.M., under cocaine. I made the usual corneal incision upward, including about two fifths of the circumference and close to the scleral junction. A small iridectomy was made and the lens easily extracted without any difficulty, accident or complication of any kind. At the time of operation there was not the least hæmorrhage, either from the sclera or iris, nor any bulging or gaping of the wound, and vision was good, the patient readily and correctly counting and designating fingers. After the usual toilet and bandaging the patient was sent to his bed in the ward. About six hours afterward the patient began to complain of pain in his eye and as this increased very much in severity, I was sent for. Not being at home, I did not arrive for nearly two hours more, at which time the patient informed me that the pain had mostly disappeared, but that the dressings were wet. Inspection showed them to be soaked with blood and vitreous, and through the widely gaping corneal wound protruded a plug of clotted blood, vitreous and membrane looking like capsule and retina. This plug was cut off, the eye irrigated and dressed, and the wound healed with a very much shrunken eye. There was no further hæmorrhage and not much pain.

The patient was a large plethoric man with a florid face, whose radial arteries were hard and evidently diseased. I have been informed that the patient died some months afterward from cerebral hæmorrhage. I am fairly well satisfied that he received no injury to his eye to cause the hæmorrhage. The other eye was, apparently, perfectly healthy, except that the lens showed incipient cataract.

Here, then, was a case of hæmorrhage, apparently spontaneous, occurring six hours after a perfectly smooth cataract extraction. The somewhat protracted period of severe pain before the appearance of blood would indicate that the source of the hæmorrhage was back in the fundus, most probably between the retina and choroid, and that with the rupture of the posterior capsule and evacuation of the effused blood with the consequent relief of pressure, the severity of the pain abated. The presence of diseased blood vessels and the plethoric habit suggest explanations of the unfortunate accident.

My other case was one of absolute glaucoma, in which an iridectomy was done mainly with a view to relieve the pain, and has this in common with the first case, that the hæmorrhage occurred some considerable time subsequent to the operation.

CASE II.—Ira W., 39 years of age, American, farmer, came to the hospital September 29, 1898. Right eye was normal in all respects. Vision in the left eye had gradually failed during last year, so that five weeks prior to this date, he could barely count fingers. Four weeks before, an attack of severe pain came on, with redness of the eye, and since then occasional slighter attacks. During last four days, constant severe pain. Eye somewhat red and all appearance of glaucoma with tension considerably increased and vision limited to light perception. Patient below medium size, thin, and general health not very good. That same afternoon a large iridectomy upward was made, after which there was slight bleeding from the iris with some tendency to gaping of the corneal wound. The eye continued painful, but the wound closed. I visited him once or twice every day, and on October 3, at 9 A.M., he complained of very severe pain, so much so that the question of enucleation was discussed. I saw him again at 1 P.M., when the wound had reopened and through it had discharged the fractured lens, most of the vitreous, and a plug made up of retina, iris, capsule

and coagulated blood protruded through the corneal wound. I immediately enucleated the eye. The source of the hæmorrhage was clearly not from the cut edges of the iris but from the fundus of the eye between the retina and choroid. In this case the result was not entirely unexpected, and prophylactic measures, such as morphia, eserine, cold applications, and pressure-bandage were adopted without avail.

THE ETIOLOGY AND IMPORTANCE OF IRITIS.*

BY HEMAN H. BROWN, M.D., CHICAGO, ILL.,

PROFESSOR OF DIDACTIC AND CLINICAL OPHTHALMOLOGY, ILLINOIS MEDICAL COLLEGE, CHICAGO.

ONE of the noteworthy features of ophthalmic literature of the past few years, and one that must appeal to anyone whose attention is directed to it, is the comparative neglect of one of the most frequent, and certainly one of the most important of ocular disorders—iritis. When we take note of the vast amount of recent literature on the more strictly surgical diseases of the eye, the disparity becomes the more apparent, and while not under-rating the worth of investigations of the latter class of affections, one is inclined to ask, have not the diseases of the iris, an organ more complex anatomically and functionally, not less important, a still greater relative importance? It is not because our knowledge of diseases of the iris is complete, for such is far from being the case. It includes, I believe a rather larger proportion of dubious or unsettled questions than does that of some of the more frequently discussed disorders. There is certainly room and need of study in this particular line, and therefore it is to some aspects of the etiology and pathology of iritis that I wish to call your attention.

When we examine the structures of the eye from without inward, passing from the external eye backward, we find the iris the first actively functioning organ, and the most complex in its structure. Its relative importance, judging from

*Read at the Fourth Annual Meeting of the Western Ophthalmological and Oto-Laryngological Association, held at New Orleans, La., February 10-11, 1899.

these facts, ought to be apparent, and it is not inferior to that of any other structure as regards its normal and its pathologic activities. The slightest disorder, a mere hyperæmia of this excessively vascular organ, is immediately reflected, so to speak, on the external ocular membrane, so that mistakes of diagnosis are frequent, and sometimes disastrous. Then, too, its internal relations with the deeper tunics of the eye render it still more important. The iris, besides its motor function, which it shares with the ciliary body, is, like the latter, an anterior extension of the vascular tunic of the globe of the eye which is completed by the choroid from behind, and this continuity of tissue naturally suggests a common pathology, at least in active inflammatory conditions, and therefore acute iritis almost necessarily involves more or less implication of the deeper tissues of the uveal tract, it can hardly be unaccompanied with some degree of cyclitis and choroiditis. I say hardly, because this is yet to some extent a disputed question, and I am constantly more impressed with the uncertainty of our knowledge on this point and of the impropriety of saying positively in any given case that it is solely an iritis or a cyclitis, for both organs are supplied by the same blood vessels and lymphatics, and bathed alike in the same aqueous solution. It is true, we can conceive of an acute primary cyclitis and a secondary iritis, the circulatory media coming first in contact with the ciliary body, but how are we to conceive of the ciliary body becoming impregnated with inflammatory products, without involving also the iris. An independently existing cyclitis is therefore improbable, and a primary iritis without a co-existing cyclitis may be possible, but is hardly probable. The involvement of the choroid follows the same rule, as its connection with the ciliary body is even more direct than that of the latter with the anterior section of the uveal tract, the iris.

The systemic or general disturbances that accompany or follow the derangement of this most important and functionally widely related organ are also an index of its importance. There is no other ocular disorder that is more painful, or that more quickly reacts upon the organism in general in producing general febrile disturbance, for how frequently are we surprised, when the thermometer is used, to note the marked elevation of temperature with an apparent slight iritis. In this respect it is almost unique amongst the local diseases of the

eye. The iris is, moreover, one of the organs that are directly attacked in systemic morbid states, not merely infectious diseases where the germs or their products seek out points of least resistance to do their evil work, though it is especially vulnerable to some of these, but it appears to particularly share in some disorders induced by auto-intoxication from deranged general metabolism as, for instance, in rheumatism or gout, or through some as yet imperfectly understood disturbance of the central nervous system, as in diabetes. Exactly how the toxins engendered in these conditions reach the iris to make it the point of selection for their attack is not clear, but the fact is they do reach it, and its involvement is a marked feature of these and many other affections. In 144 cases of diabetes, Galezowski (*Jahrb. f. Augenh.*, 1883, page 297), quoted by Knies, found iritis in 7 cases, or nearly 5 per cent. of the total. The iritis of rheumatism is so well known and so marked a complication that its consideration will be taken up more *in extenso* later in this paper.

To me, one of the most interesting and suggestive subjects connected with the pathology of this organ, however, is that of sympathetic ophthalmia. We are all well aware that when one eye is injured, and the lesion extends to or involves the so-called danger zone or ciliary region, there is apt to follow an involvement of the other eye, beginning with the well-known ciliary disturbance and coincident iritic involvement, and in many cases true plastic irido-choroiditis in the fellow eye, and rapidly extending to other parts, causing complete functional destruction of the second eye. Assuming, as some do, that this is due to an infection traveling, let us say, by the route of the optic nerve, ciliary reflex or circulation, the fact that it first acts on the iris or ciliary body is a curious one. Why should it at first pass by the corresponding ciliary body to the iris to involve the ciliary body secondarily, or *vice versa*? Is it because the iris is, through some sympathetic disorder of innervation, not yet ascertained or theoretically explained, rendered especially vulnerable to germs of disease in such cases? It is not necessary to assume the presence of microbic germs to explain a non-suppurative inflammation, but the carriage of their toxins even in this case is difficult to reason out, especially if we have also the puzzling problem of their elective affinities to solve. If we confine the consideration to the

possibility of merely toxin infections, we have difficulties enough; but they are more easily met from a theoretic point of view than are those of the actual transmission of the germs from the originally infected eye, which has been seriously argued to account for sympathetic ophthalmia with its iritic involvement. We know that microbes travel through the blood vessels and the lymphatics, and that many even of the pathogenic forms are our constant parasites, but are harmless for evil unless they can find a weakened point for their attack, and even then, often without complete success. For instance, the tubercle bacillus asserts its presence to a certain extent, even on that especially fatal field, the lung, in a large proportion of the human species. It is estimated by some that as high as two or three of every five young persons have suffered at some time in their lives from latent tuberculosis (*Brit. Med. Jour.*, 1898, Kelsch, on "X-Ray and Tuberculosis,") and from which the great majority suffered no serious consequences. It is not remarkable, therefore, that there should be microbes found in iritic inflammation, but their presence alone does not necessarily prove their causal connection with it. They may be simply taking advantage of a condition found ready at hand. The discussion, therefore, as to the actual microbic origin of sympathetic ophthalmia, while leaving the matter undecided as to the facts, is less important, as in no case could the question be positively settled without tracing actual inflammatory action by some route, either that of the optic nerve (?), the one most suspected means, or some other as yet unknown. It is far easier, therefore, and it may be fully as rational, to suppose some trophic influence acting first through the nervous system preparing the way, or even setting up the actual lesions, than to assume the propagation of either microbes themselves, or even their products directly from one eye to the other. However, we may leave the subject of sympathetic ophthalmia, it is nevertheless one of the puzzles of ophthalmologic practice, and is full of suggestively open questions, yet it is a clear demonstration of the pathologic importance of the iris and its inflammation.

Another feature of iritis that gives its importance among eye disorders is the pain and discomfort it produces. There is no other ocular affection, except possibly some extreme cases of acute glaucoma (?), that can compare with iritis in this re-

spect. This fact also would be sufficient, it would seem, to call attention to it more frequently, for while we may have exceptional cases of insidious progress—"quiet iritis" of Jonathan Hutchinson—the most ordinary symptom is pain, and this may be and often is most excruciating. Whether this pain be neuralgic or due to tension, as is usually the case, it is a serious symptom in itself, and one that alone ought, it would seem, to call more frequent attention to this disease in the literature of ophthalmology.

In what has been already said, the importance of iritis has, I think, been shown, and while much more could be offered, enough has been suggested to demonstrate that the existing comparative neglect of the subject is not justified by any lack on its part of clinical or pathologic interest. While the etiology of the disorder has already been alluded to in one or two regards, it is so important a subject from a practical point of view, and one that is also still so unsettled in some respects that it deserves some discussion.

I have already spoken in regard to the question of actual bacterial and of toxic infection, and expressed the opinion that the former is not essential, and when it is demonstrated may be a secondary condition. A question suggests itself, Can we have a purely neurotic iritis, one in which direct infection either by bacteria or their toxins does not exist, and which is due to reflex trophic irritation? Such an iritis would probably not remain long uninfected, but I see no reason for denying its existence, and, as already suggested, it seems to me a natural mode of accounting for the puzzling facts of sympathetic diseases of the iris and ciliary body. And, again, the cases of iritis occurring in connection with neuralgic affections and the association with it of herpes zoster, as not infrequently found, are also suggestive in this connection, for there is no question as to the neurotic origin of the inflammation of herpes, however much infected with bacteria its lesions may later become. Sufficient proof have we, however, of a neurotic origin for certain forms of iritic irritation, that valuable time can yet be spent in investigation in this direction.

Taking, however, the well-established causes of iritis in which infection can be assumed, we find the first place occupied by a syphilitic disease, the germ or toxin of which has neither yet been satisfactorily isolated, and yet one that seems

to act especially through an intoxication of the system. The percentage of iritis due to this cause varies from 42 per cent. (Nettleship) to 70 per cent. by different authors (De Wecker), and we can probably estimate it with safety as the exciting cause of more than half the total number of cases of iritis that occur. This is in some respects a favorable fact, to be sure, for it is from this cause the more amenable to treatment, and, furthermore, syphilis is in general an avoidable disease by the individual. On the other hand, only a small proportion of syphilitic cases suffer from iritis. Seggel (*Archiv. f. Augenh.*, IX, 254), for example, found only 4 cases in 382 of constitutional syphilis, or only slightly over one per cent. It would appear that it is with all its frequency a rather infrequent complication, and is indirectly, therefore, a bad indication, as showing the great prevalence of syphilis. Iritis from rheumatism, which is generally estimated as next in frequency, though very much less frequent, is not like the preceding so much an individually avoidable disease, and its comparative lesser frequency taken with the very general prevalence of rheumatic affection is therefore fortunate, as it indicates that it must be a rarer complication of rheumatism than of syphilis. Clemens, of Berlin (1882) gives the remarkable estimate of 9 per cent. of all cases in the ophthalmological department of the Charité Hospital, Berlin, while Nettleship, in 1883, stated that 33 per cent. of all cases of iritis were rheumatic in origin, but from a large number of authors on this subject we feel warranted in estimating rheumatism to be the cause of a large number of cases of iritis, and from the very oscillating and manifestly obscure rheumatic symptoms, and our present knowledge of rheumatism increasing daily, as it is, I am led to feel that the per cent. of rheumatic iritis will be increased in the future, as there is perhaps no common disease confronting the medical man to-day more perplexing than rheumatism, and more obscure in its manifestation in many cases. The peculiarities of rheumatic iritis are well known; it is generally bilateral, and is probably the most painful of all types of the disorder, and likewise the most rebellious, and inclined to relapse on the least provocation. In many instances it is the first manifestation of the rheumatic diathesis, or the signal of an approaching rheumatic arthritis, and its recurrence appears occasionally to occur independent of any marked rheumatic symptoms. It is

not remarkable, however, that this should be so, since with the tendency once well established, the sensitive structure of the iris would readily relapse under the irritation of the toxins present. Until we know positively of a rheumatic germ and its habits, it is only speculation to assume it or any other form lying latent in the iris structure to revive its activities under fresh stimuli. That rheumatic iritis is directly infectious, however, would seem to be indicated by the experiments of Ahls-tröm (*Centbl. f. Augenh.*, 1896, page 95), who inoculated the eyes of healthy rabbits under all precautions with a bit of rheumatic iris, and reproduced the disease, while control-experiments from glaucoma and catarrh were negative.

Syphilis and rheumatism are the two best known and most frequently recognized causes of iritis, and it is a notable fact that they both belong to a class of disorders that are supposed to act by producing a general dyscrasia, or intoxication of the organism, and that in neither of them has the original infective germ been satisfactorily proven to exist. It is true that discoveries of it have been claimed, but they are not yet recognized or proven to general satisfaction; while we know perfectly well that in both a systemic poisoning takes place. The same is true, to a certain extent, with diabetes, which was mentioned earlier in this paper as responsible for a certain proportion of cases. We may call acute rheumatism an infectious disease, but it is not so easy to admit all the forms of chronic rheumatic and gouty affections to the same category, yet they may all, or most of them at least, produce iritis.

Syphilitic and rheumatic iritis, including probably over three-quarters of all cases, therefore, are suggestive of questions that can only be referred to here—questions that are yet unsettled in the etiology of iritis.

There are some interesting problems also connected with the iritis from infections that are well demonstrated as bacterial. Why, for example, should disease of the uveal tract be so infrequent or absolutely unknown in connection with so many other equally infectious disorders is a point of interest, and suggests a line of research that might be profitably followed up.

The germ diseases causing iritis in which the actual discovery of the microbe has been made in the inflamed iris are not numerous, the usual organisms found are merely the ordi-

nary cocci of suppuration. Tuberculosis has been microscopically identified, and tuberculous iritis may be considered a well-established type, and the frequency of tuberculosis renders this a very important fact. Gonorrhœal iritis is probably diagnosed on the *post hoc* principle in many cases, but it probably exists, and, indeed, Krassnig has recently (*Woissnow Med. Jour.*, November, 1897) reported finding the gonococci in the pus from an iritis occurring the twenty-eighth day of a gonorrhœal urethritis. An interesting case in my own experience in connection with this subject was that of a young man whom I treated on two different occasions for iritis of the right eye. The iritis at each time mentioned was not severe, but with no previous history of rheumatism or syphilis. At each time I treated him for iritis he was suffering from gonorrhœa, and complained of constant pain and suffering in the right knee-joint. A question yet remains in my mind as to the cause of his iritis in the absence of microscopical findings. Might this be classed gonorrhœal? Leprosy is said to be a frequent cause of iritic inflammation, according to Lopez (*Archiv. f. Augenh.*, XXII, 1890, 318), advanced leprosy nearly always affects the iris. This, however, with us, being a less-frequently found malady, concerns us less. Many other disorders are reported as occasionally complicated with iritis, among them malaria, which is especially characterized by its tedious course, and in which Bradley states two especially characteristic features, namely, its periodicity and proneness to recurrence; typhus and typhoid, varicella, influenza, and some cases have been reported as due to trigeminal neuralgia (Gould), and to suppurative affections of the nasal passages (Ziem, Fage). In some of these cases the diagnosis was apparently only by exclusion, and in all of them the disorder may be conceded as rare and exceptional, except probably in influenza, where hyperæmia of the iris is said to be frequent (Knies, "The Eye in General Diseases," page 394). In speaking of influenza, I would state that at this time I have in charge a young woman, 22 years of age, who, upon recovery from influenza—apparently not severe in its nature—noticed her right eye to be very red, and two days later on rising in the morning was much surprised to find her pupil obscured completely by a yellow film and the eye blind. The patient at this time was in Memphis, Tenn. She returned immediately to Chicago, and I was called to see her.

I found the anterior chamber partially filled with pus, which resulted from an iritis. This was one week ago. At this time the pus has entirely disappeared, but the vitreous is very cloudy. I mention this in detail as it is much in keeping with this subject, bearing upon the relation of iritis to influenza.

We can summarize, I think, the facts that have been actually acquired as to the etiology of iritis as follows:

1. A majority of all cases, ranging from 55 to 65 per cent. are due to syphilis, and a smaller proportion, varying according to different estimates from 10 to 20 per cent., may be accredited to arthritic toxins. The small percentage left is caused by various constitutional and infective disorders, with also a strong probability of the existence occasionally of a true sympathetic or neurotic iritis entirely distinct in its origin from any infectious process whatever. Traumatic iritis, except as it may indirectly give rise to the last-named form, is here unconsidered; its mechanical origin places it out of the scope of the present paper.

2. There is a wide range for speculation as to the mode of action of infections on the iris, but at the present time the facts point to the action of bacterial products or toxins rather than to that of the germs themselves. In only a few affections have the characteristic bacteria been found directly in the inflamed iris; in others only the ordinary pus cocci are present to indicate a secondary infection.

In what has been said, I have endeavored to invite attention to the importance of iritis, and to some yet unsettled question of its etiology. It is, in my belief, one of the most important, if not actually the most important, of all ocular affections. Ophthalmology, treating as it does of an organ that is primarily an optical physical apparatus, obeying the laws that govern the transmission of light, should be one of the most exact of medical specialties, but we must not forget that there is hardly any phase of pathology or any primary pathologic process that may not be in action in diseases of the eye. Iritis is an affection that does not appeal directly to our surgical instincts, and it is therefore necessary that we should be as ophthalmologists, physicians as well as surgeons. There is certainly no eye disorder that is more full of interesting problems and suggestions, and none, it is probable, that when fully and properly studied, is of greater promise as regards our therapeutic control.

THE BEST VISION AFTER CATARACT EXTRACTION.*

BY W. E. DRIVER, M.D., NORFOLK, VA.,

U. S. EXAMINING SURGEON—EYE AND EAR SURGEON, HOSPITAL ST. VINCENT
DE PAUL, NORFOLK HOSPITAL, NORFOLK & WESTERN R. R., SEABOARD
AIR LINE R. R., ATLANTIC & DANVILLE R. R.

IN presenting this subject it is not my desire nor do I intend to enter into each and every phase of cataract extraction. I simply wish to bring to your notice the methods I have found approximately satisfactory in obviating the most common complications arising in the first few days after the extraction of a mature senile cataract. And I will for convenience take them in the order of their frequency, believing it the most satisfactory way of getting at what I have to say. I wish to emphasize though, as a preliminary remark, that in a given case (that is, everything else being equal) I have found the best vision after simple extraction without iridectomy. By the best vision I not only mean the most acute, but the vision with the greatest range from far to near point, as well as laterally, and the vision that is most lasting. In doing the simple operation then, our emergencies are, *Iritis, Hernia of Iris, and Suppuration.*

Iritis.—Most of the true iritis occurs in those persons with either a rheumatic diathesis or some real manifestation of the disease; this though might be so trivial as not to cause the patient the slightest concern or inconvenience. Here, too, I have a slight digression. This form of inflammation of the iris (the microbic cause of rheumatism not being isolated), gives us an example of another form of inflammation than that defined by Professor Senn, of Chicago. I do not know his views as to the etiology of rheumatism.

To avoid rheumatic iritis following cataract extraction, it is self-evident that our patient should be as free as possible of this disease before the operation. The patient that comes from a distance as well as the one at home—instead of being promis-

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cuously operated upon the day after the consultation, is rigidly quizzed as to whether he had ever had any of the forms of rheumatism, or if he has any symptoms of the disease at present, thus, endeavoring to gain, to a greater or less extent, a knowledge of the patient's physical condition. Patients with only a history, but no active symptoms of the disease, I give anti-rheumatics in moderate doses for a few days, and then operate. Patients with the slightest active demonstration of the disease are sent back to their homes to take energetic anti-rheumatic treatment. This the family physician sees to and when in his opinion the patient is in a good condition and ready to return for an operation informs me of the fact. I take pains to instruct the family physician as to my desires that he may know when to intelligently return the patient to me for an operation. It always means several weeks after the symptoms have disappeared. When they come into my hands the second time they are given, before and after the operation, in fact, the whole time they are in the hospital, saline, saline waters, and lithia water. I take care, too, not to operate unless the weather is favorable. If you avoid rheumatic iritis I can assure you there will but seldom be any other form of iritis to treat after your mature lens extractions.

Again, we must obviate microbic iritis (inflammation this side of suppuration). This, now inexcusable disease, notwithstanding the advance in aseptic surgery, still claims its share of victims. It is inexcusable I say and surely it is as we all recognize, unless the infection comes from within through the general circulation. This though is far from being common, the exception here does not prove the rule. It is more than likely that our patient has either not been properly prepared, or has been infected by the assistant's or operator's hands, drugs, water, instruments, or dressing.

As before said, the patient is always sent to the hospital, where he has the routine bath (general). After that the face, and as much of the head as possible, eyelids, and hands are scrubbed up thoroughly with soap and water. I find convenient for making the eyelashes and lids clean a soft bristle tooth brush; it answers the purpose admirably. Then the same parts are washed off with alcohol and ether—taking care not to get any of the soap or alcohol mixture into the eye. Thirdly, this is washed off with sterilized water. The eye to be operated

upon is dressed with a 1-6000 bichloride of mercury solution, using sterilized dressings. After the eye has been bandaged up the nurse is instructed to drop, every three hours, enough of the same solution of bichloride of mercury on to keep the pad wet. The pad is removed every four hours and a fresh one supplied, and at the same time several drops of the 1-6000 solution are dropped into the eye—in short, the eye is practically irrigated when it is re-dressed. Say, my patient enters the hospital one evening, as he generally does, he is operated upon the morning of the second day. Operator's and assistant's hands are scrubbed thoroughly to the elbow with green soap and water. The soap is then washed off with hot sterilized water, and the hands are immersed for five minutes in a 1-1000 bichloride solution, when they are again rinsed in sterilized water to remove the bichloride. The cocaine is made up with distilled water. The bottle, and pipette forming the stopper, all are thoroughly sterilized before and after the solution is made. Only sponges of sterilized cotton are used, and the water is always either boiled or distilled. As to the instruments, I prefer boiling them in distilled water to which has been added a little biborate soda (borax), to any other method of sterilizing them. I do not think the ingenious apparatus for using formaldehyde, originated by my friend, Dr. Reik, of the Johns Hopkins Hospital, altogether as safe a method as their immersion in boiling water. There is but little or no deleterious effect on the edge of the instruments from the five minutes' immersion in the boiling water. Instruments with ivory handles are soon demolished, and those with aluminium handles do not stand the soda, so I prefer to have all handles made of German silver. I do not credit the habit of simply sterilizing the blades, as I find a great many of the physicians doing, the handles as well as blades should be thoroughly sterilized. All the dressings to be used at the operation and for re-dressings are sterilized for one hour in an ordinary Arnold steam sterilizer. In other words, you will observe that my preparations are very much of the same manner as those of the clean general surgeon who is preparing to do a laparotomy.

Still another condition that comes under this head, but can not be correctly called an iritis, is the union between the raw surfaces of the iris and capsule, forming a posterior synechia. This is a well-recognized condition and has been demon-

strated by a number of surgeons. Taking my choice, I prefer a capsular cataract to a posterior synechia. I am therefore more than careful how I rupture the lens-capsule. With a great many others, I never remove the anterior portion of the capsule with the so-called capsular forceps of Schweigger or Förster. I use a bent cystotome, the cutting edge of which is on the convex side. It is of the greatest importance that the cutting surface of the knee should be extremely sharp, so that the capsule is cut instead of being torn. I introduce the cystotome into the anterior chamber, with the knee to the temporal side. The point of the instrument goes under the iris at the most dependent part of the capsule, the knee is turned down, and with the cutting edge an incision is made vertically to the corneal flap, extending to the lower edge of the upper portion of the iris. The cystotome is then withdrawn in the same manner as introduced, taking care not to injure the iris. Thus the capsule is freely opened, and after the lens has been expelled, curls under so that the cut edges do not come in juxtaposition with the more or less lacerated iris. During the expulsion of the lens it is more than probable that the rent in the capsule is made complete or extended well up under the iris. As a further preventative to any synechia that might form, or iritis, forty-eight hours after the operation two drops of sterilized solution, four grains to the ounce, of sulphate of atropine is instilled into the eye—that is, if the pupil is found central. In forty-eight hours more, two drops of the atropine solution are again instilled into the eye. The atropine is then kept up once a day until the pupil is well dilated, and there is no tendency to iritis or synechia.

Hernia.—The first step to prevent hernia of the iris is to have the patient absolutely quiet during the operation. To do this you must have the entire confidence of the patient; but to secure a more placid state even that this can give, it is my habit to give the patient one-half hour before operation twenty-five grains of bromide of soda. This can do no harm, though it it surely aids the patient to more easily control himself, and fix the eye upon a given point. To insure absolute quiet, that the patient may have no jar, or be called upon for any muscular movement during, or after the operation, a suitable bed is selected for the operation. Dr. H. Knapp, of New York, thinks this precaution of but little use (and speaks of it as making

virtue of a necessity). Other men though are using the bed instead of the operating table and consider it an absolute necessity to their armamentarium. The bed I use is for individual convenience made in the following manner: The framework is of one and one-half inch white enamel hollow tubing set on five inch rubber-tire castors. The width of the bed is forty-two inches, and from the floor to the top of mattress is thirty-four inches. The head of the bed is made removable. The



FIG. 1.—Showing Bed Before Operation.

large castors enable the bed to be easily moved to the operating room, or to the source of light, and back to the darkened room where the patient is to remain, without the slightest jar. No man, how well he can operate, is justified in allowing his patient to walk up or down two or three flights of stairs to his room from the operating table, or even to be carried on a stretcher.

After operating, the removal of the speculum is of great importance. It should be done in such a way that the upper jaw of the speculum does not come in contact with the corneal flap, such an entanglement would be sure to elevate its free edge, and reduce the desired apposition of the two surfaces. The upper lid, too, should not be allowed to close immediately over the eye. For, in a large percentage of cases it would

press the corneal flap over and thus invite a hernia. I obviate both of these conditions by taking the handle of the speculum in my right hand, and with a slight upward movement elevate the lid and at the same time catch a number of the lashes of the upper lid between the thumb and forefinger of the left hand, holding the upper lid stationary to the brow. The speculum is then closed and removed, after which the corneal flap, if necessary, is adjusted with the spatula. The upper lid is



FIG. 2—Showing Bed After Operation.

then lifted over the corneal wound, and the patient is told to keep both eyes closed. The lids are good splints and if kept closed will keep the corneal flap in the desired position. I consider it always necessary to bandage both eyes. This is done with the figure 8-bandage with two long and two short tapes. The patient is then rolled into the darkened room, and taken charge of by a specially trained nurse. A good nurse can do more to prevent hernia than all the devices, such as hoods, tea-strainers, and contrivances of this kind in existence. I consider all appliances of this class worthless and worse than

useless, and will never use them again, so long as a nurse is to be had. When I leave my patient I have no great anxiety about hernia. I warn him to keep his eyes closed, and assure him that the nurse will do everything that is necessary for his comfort. The nurse not only sees to every comfort, but is held responsible for every movement of the patient as long as it is deemed necessary. The patient is fed by the nurse, thus obviating one of the most common ways of using the eye after the operation, for the operated eye will, to a greater or less extent, take the same motions as the eye that has not been operated upon. Further, too, the nurse sees that the patient does not, during his sleep, disturb the dressings, or in any way strike the eye with his hands or bed-clothing. The patient moves in bed only enough to remove the tiring of one position. The bowels are kept moderately active, and the patient is not allowed to sit up, but uses the bed-pan; there must be no straining and the patient is constantly reminded of this by the nurse. If there is any other pain to cause the patient the slightest discomfort the nurse is instructed to give a mixture of bromide and chloral. This removes the pain, quiets the patient, and produces normal sleep. I find this mixture also very useful to relieve that constant desire to urinate after the operation in old men that have some form of prostatitis. If there is no other pain than that attributed to the operation the eye is not opened for inspection for thirty-six hours, and it is then that I expect to find a round central pupil. In a certain number of cases we have hernia induced by the *vis a tergo*, fortunately though, this is an unwonted condition. So far, I know not when to expect it, or how to prevent it.

As a striking example of this form of hernia, I will cite a case that came under my observation some years since, when I was resident surgeon at the Presbyterian Hospital, Baltimore. A patient of Dr. Julian J. Chisolm, Miss W., 47 years of age, was operated on for mature senile cataract, without iridectomy, had no complications, and was discharged from the hospital two weeks after the operation as cured. Nineteen days after discharge she had re-opening of the corneal wound and hernia of the iris, causing her return to the hospital. There was no history of injury or contusion of any kind.

After the operation I do not use eserine. It might be a good thing were it not for its tendency to precipitate an iritis.

Therefore, I do not use it. I take other precautions, to some they may seem unnecessary, but I do not feel so far that I am doing an unnecessary thing or using too much care.

Suppuration.—What has been said as to the preventative of microbic iritis also applies to suppuration of the corneal wound. I failed to say, though, that the sheets and pillow-cases are thoroughly sterilized. Owing to the darkness of the room, in which the cataract patient is to remain, we have to use extra precautions in keeping it thoroughly clean. It is but seldom that it can be given a real good sunning, which goes a long ways towards making a room clean. My rooms for cataract patients and other plastic work are made clean and kept clean, and no infected or suppurated cases are ever put in there. My fear of suppuration is now limited to very old persons, it is in them that we are most apt to have a slough. I use every method to improve their general nutrition. Their diet should not only be the most nutritious, but should be slightly stimulating. Milk-toddies I give quite freely. While I seldom use preparatory drugs I find pepto-mangan (Gude's) is well borne and does good, and in these cases I prefer it to the other preparations.

SOME EXPERIMENTS WITH THE GIANT MAGNET.*

BY HAMILTON STILLSON, M.D., SEATTLE, WASH.

THE writer had hoped to include in this paper the report of some experiments on the influence of the force of magnetism upon the composition of photographic plates. The series of experiments in that line are not yet completed. The report of them will have to be deferred. Enough has been accomplished, however, to induce us to hope that with a suitable plate, a suitable magnet, and a suitable object, results can be obtained from magnetism which will compare somewhat favorably and will resemble somewhat the effects of the X-ray in producing shadowgraphs upon photographic plates; and the writer mentions his uncompleted experiments at this time

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only in the hope of stimulating others to experimentation on this subject.

Many other perhaps more practical and certainly more easily conducted experiments also need to be made with the giant magnet, for instance, determining the proper manner of manipulating the magnet in the extraction of paramagnetic foreign bodies from the interior of the eye. For, as a matter of fact, results from the use of the small hand magnet and results from the use of the giant magnet have, until to-day, been far from a realization of the reasonable hopes entertained by oculists possessing such magnets. Surely everyone who has had experience in the use of the giant magnet has been surprised at the often untoward reaction following its use.

From the series of experiments whose detailed account would unnecessarily burden this paper, and from observations on the behavior of the magnet and the attracted foreign body in actual office operation, the writer would make the following conclusions:

1. The field of magnetization extending from the tip of the magnet, and appreciated by the vibration of a small magnetic needle, is about 10 meters varying, of course, with variations of the current.

2. The actual working distance is usually contact of the eye with the magnet.

3. With the eye at a distance of five millimeters from the tip of the magnet, and with six or eight ampères of current, the magnetic force will be about 130 gm.; multiplying the distance by three divides the force by seven.

4. Dividing the weight of the object by *two* divides the attraction by *six* if the object be iron, and by about *four* if the object be steel.

5. A paramagnetic body, as iron or steel, becomes a magnet upon being attracted by a magnet and assumes opposite poles. Not only should the shape of the foreign body be recognized as fully as possible before operation, but the operator should determine what position he would prefer it to be in for extraction and which end he would desire to come first.

6. Usually the best line to use is the line that radiates from the tip of the magnet. In Fig. 1 the directions of the lines of force from the magnet are indicated by knitting-needles which have been attracted into the positions represented in

the figure. This central line of force should be applied to the long diameter of the foreign body, if possible, in such a way as to place the foreign body in the position most favorable for extraction.

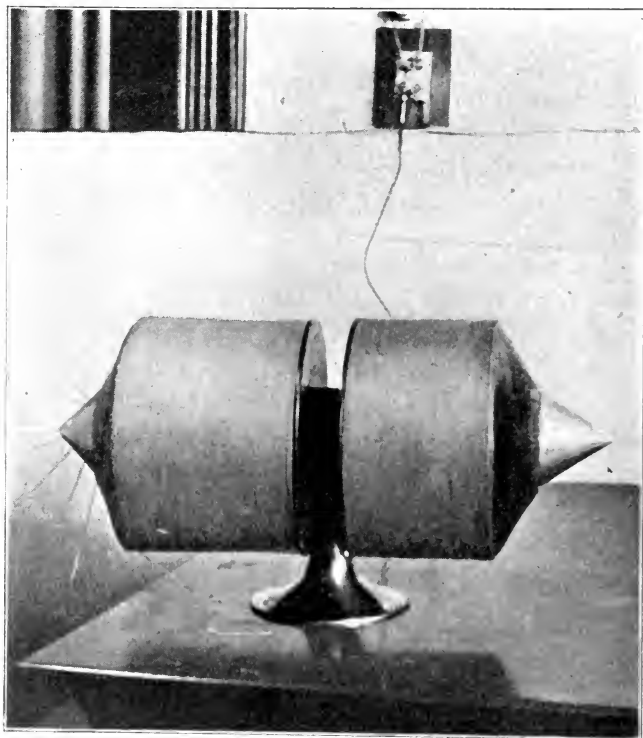


FIG. I.

7. The management of the foreign body will depend more upon its shape than is generally believed. If the object be disc-like, it should be made to saw its way with the edge forward; if it be pyramidal, the point should be extracted first.

8. To accomplish this purpose the eye and the magnet should be relatively in position and still before the current is turned on. It is a mistake to place the patient at a distance and cause him to approach the magnet gradually.

9. A rheostat should generally be used with the current, especially if the body be large. Only a very slight current should be attempted at first or until the piece of steel is made to assume a position easy for its accouchement. The placing

of the foreign body, it may be said again, in proper position for making its exit, is of as much importance as is the proper presentation of the infant at parturition.

10. Knapp says that foreign bodies in the vitreous are arranged by preference in the lower part of the vitreous, but experiments tend to show that this will depend upon the size and shape of the foreign body, the length of time it has been in the vitreous, and the character of the vitreous. For instance, blood in the vitreous will well up and float the foreign body towards the point of exit of the blood. This will be especially the case if the piece be small (less than 0.02 gm.). Then, too, if the piece be small, and the vitreous somewhat fluid, the foreign body if given time may sink. The vitreous humors of different eyes differ greatly as to their liquidity. If the vitreous be not especially fluid a small piece may float where it first lodged.

11. Small pieces with great difficulty penetrate so far as the vitreous; a piece weighing less than 0.02 gm. will often stop in the cornea or sclera. Great force is required to cause such a piece to pass on through the lens or through the sclera. They will often be caught in the iris, especially if the iris is somewhat distant from the lens. They seem to be caught by the iris as a falling acrobat is caught by his net, or the fish is caught by the seine.

In two of my cases in practice the large pieces had passed on through the lens into the vitreous while the small pieces were caught in the iris (sifted out by the iris) where they remained.

12. Small pieces that are behind the iris are difficult to remove by means of the giant magnet. Under its attraction the foreign body will cause the iris to bulge up or be dragged one way or the other, but they will not cut their way through the iris. (An attempt has been made in Fig. 2 to show this lifting up of the conjunctiva when a small piece of steel under it is attracted by the magnet). This attempt at their removal will not only fail but the effort at removal will do great violence to the iris. A preliminary iridectomy, or at least iridotomy, should be performed, then a small hand magnet (the Hirschberg or other form) should be used in preference. This rule will apply also to small pieces under the conjunctiva. A small piece can be made to excavate its way around under the

conjunctiva without making its exit, the conjunctiva in the meantime being bulged up into a wavy cone. The tip of the Hirschberg magnet inserted through a slit in the conjunctiva is preferable to the giant magnet in such cases. Snipping the foreign body out with forceps and scissors in such a case, or touching the foreign body with a small cautery point and letting the foreign body come out on the eschar are equally successful ways of disposing of small pieces under the conjunctiva.

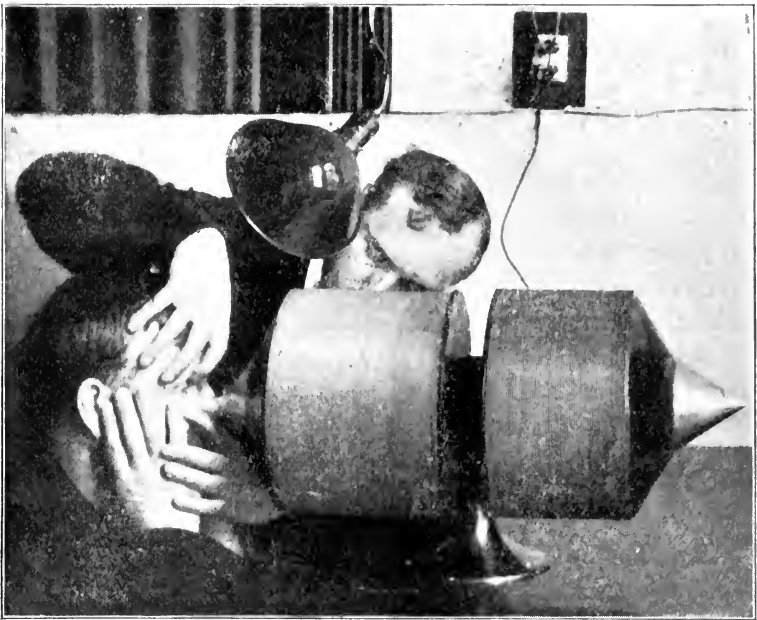


FIG. 2.

13. Large pieces may be made to perforate the iris or conjunctiva if they have a suitable shape and are managed properly.

14. Large pieces should have the current turned on slowly and time should be given them not only to find their point of least resistance and place themselves in proper position to avail themselves of it, but to cut their way. Fifteen or twenty minutes' application of the magnet may sometimes be necessary. Pieces weighing in the neighborhood of 2 cg. may be made to swim about in the vitreous in any desired direction.

15. Haab extracts foreign bodies from the vitreous by placing the point of the magnet at the sclero-corneal junction and causing the foreign body to roll around the edge of the lens and so on into position behind the iris or to come through a preparative opening made in the iris. Small pieces may perhaps be best extracted in that manner, but large pieces almost invariably do damage to the edge of the lens and to the iris. A better plan with large pieces, especially with those that have entered through the sclera without injuring the lens is, after locating them and arranging them in proper position for extraction, to make a hole in the sclera nearest to where they lie, if convenient, and extract them through the opening.

16. The best way for opening the sclera will often be with the galvano-cautery. It is less painful and seems to be less liable to sepsis. The slightly prolonged drainage afforded by it is often necessary for success.

17. If the operator is in doubt as to whether the size and shape and location of the foreign body render it suitable of extraction from the vitreous around the edge of the lens and through the iris, and he wishes to make a tentative trial of the magnet, instead of applying the tip of the magnet to the sclero-corneal junction, as recommended by Haab, a good plan is to remove the tip of the magnet and insert the eye into the opening at the end of the magnet as far as the sclero-corneal junction, applying the current slowly. Removing the eye from the magnet for repeated examination will enable the operator to determine what part of the ciliary region the foreign body will approach.

18. It is not always best to endeavor to remove the foreign body from the opening it has made in its entrance. Of course a foreign body that has passed through the cornea and iris and lens and remains in the back part of the vitreous would not be removed through the cornea. A ragged piece that has entered through the upper part of the sclera or ciliary body, but which lies in the lower anterior part of the vitreous, is often best removed through a cautery puncture in the lower part of the sclera.

19. The giant magnet forms a good means of determining whether the foreign body be free in the vitreous or not. If the attraction of the foreign body causes much pain the foreign body may be judged to be attached to the choroid and sclera.

Yet the giant magnet should seldom, if ever, be used for such purposes of diagnosis. Such haphazard application of the force is almost certain to displace the foreign body disadvantageously.

20. The writer is not experienced in the use of the sideroscope, but from the recent reports concerning it, it doubtless is far inferior to the modern X-ray appliances in determining the size, shape and location of a foreign body. In the writer's experience, however, fully half of the foreign bodies can be pretty definitely estimated by the ordinary means—ophthalmoscope, transillumination, etc.

21. The question of anæsthetics is one that must be settled by circumstances, that is to say, by the character of the patient and the conditions of the case. Blacksmiths, iron-moulders, saw-filers, and others, accustomed to getting pieces of iron or steel into the eye, can usually be relied upon to bear the pain and to place the eye in suitable position for the operation without an anæsthetic. Wood-choppers usually are not so tractable. In this wooded country where steel wedges and steel sledges are almost universally used in splitting logs, wood-choppers furnish a large quota of cases. Their eyes are seldom struck but when struck are injured badly. Large, sharp, jagged pieces from the edge of the hammer rebound from the wedge into the eye, where, in many instances, they pass entirely through the eyeball and lodge in the bone behind. Many of the cases of foreign bodies in the eyes of wood-choppers require general anæsthesia. If the foreign body is easily seen and promises to be easy of extraction cocaine anæsthesia will be sufficient. In some instances the writer has, without apparent detriment, fortified the cocaine with the use of the supra-renal gland extract. Where general anæsthesia is necessary, it should be profound, for the operator should have absolute control of the position of the eye for a sufficient length of time.

OPERATIVE TREATMENT OF HIGH MYOPIA.*

BY H. V. WUERDEMANN, M.D., MILWAUKEE, WIS.

THE author notes the advantage the German ophthalmologists have over Americans for observation of the myopic disease on account of the well known prevalence of myopia among the Germans. High degrees of myopia (over 12.0 D.) are even rare in America. He minutely describes two patients in whom the operation has been done with most satisfactory results.

CASE I.—Female, 20 years of age, whose refraction was :

R., — 16.00 \bigcirc — 1.50 ax. 180°, V. = $\frac{6}{xxxvi}$;

L., — 14.00 \bigcirc — 1.25 ax. 180°, V. = $\frac{6}{xxxvi}$;

and who complained greatly of smallness and distortion of images and inability to use the eyes for near work, even with much weaker myopic correction, was treated by discission of capsule and subsequent extraction of the lens-matter. The resulting refraction was :

R., + 1.00 \bigcirc + 2.00 ax. 115°, V. = $\frac{6}{xxiv}$;

L., + 2.00 \bigcirc + 3.00 ax. 75°, V. = $\frac{6}{xxiv}$;

with the addition of + 3.50 D. she was enabled to read small print and with distance glasses to read very well.

CASE II.—Male, whose refraction before operation was over 20.0 D., with correcting lenses he could only count fingers at ten feet. One eye was operated upon by two discissions with the result of enabling him to see small print without glasses at twelve inches and to see well with weak concave lenses in the distance.

The literature of the subject is freely quoted and exhaustively considered. The advantages, disadvantages and indications of the operation are fully discussed.

He concludes as follows :

1. Surgical treatment of myopia should be limited to cases over 12.0 D. who suffer great inconvenience from their correcting lenses.

*Abstract of paper read at the Fourth Annual Meeting of the Western Ophthalmological and Oto-Laryngological Association, held at New Orleans, La., February 10-11, 1899.

2. The operations are mainly indicated in young adults.
3. Cases having considerable changes in the ocular structures, such as progressive choroiditis, fluidity of the vitreous, or detachment of the retina, are not applicable for operation.
4. The dangers of operative interference are more than counterbalanced by the results to be achieved, which are: Increased visual acuity, enlargement of the visual field and extended use of the eyes, which accompany diminishment of the myopia.

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ORIGINAL ARTICLES.

ACUTE AND CHRONIC GLAUCOMA.¹

BY DUDLEY S. REYNOLDS, A.M., M.D., LOUISVILLE, KY.,

PROFESSOR OF OPHTHALMOLOGY, OTOTOLOGY AND MEDICAL JURISPRUDENCE IN THE
HOSPITAL COLLEGE OF MEDICINE, MEDICAL DEPARTMENT OF THE CENTRAL
UNIVERSITY OF KENTUCKY—SURGEON TO THE EYE AND EAR DE-
PARTMENT OF THE LOUISVILLE CITY HOSPITAL, AND THE
GRAY STREET INFIRMARY, ETC.

THE treatment of glaucoma, acute and chronic, which is the title of the subject assigned to me by your Committee, necessarily involves some reference to pathologic conditions. It is unfortunate that the term, glaucoma, which is always used in a generic sense, should have been so long retained in our nosology.

I shall assume that acute glaucoma means the occurrence, either primarily or incidentally, in the course of some other affection, sudden increase of tension in the eyeball, with more or less pain, circum-corneal injection, with diffuse opacity of the refracting media, corresponding dimness of sight, with irregular peripheral contraction of the field of vision. These phenomena are usually attended with dilatation of the pupil, profuse lachrymation, sick-headache, photophobia, increased frequency of respiration, pulse, and elevation of body temperature.

¹Read at the Fourth Annual Meeting of the Western Ophthalmological and Oto-Laryngological Association, held at New Orleans, La., February 10-11, 1899.

Sudden increase of tension of the eyeball, sick-headache and general pyrexia offer two therapeutic indications:

First, prompt and thorough evacuation of the alimentary canal.

Second, active diaphoresis, and diuresis.

Until these conditions have been well established, no sort of local treatment is indicated.

Now, it must not be forgotten that, iritis is frequently a co-existing complication in acute glaucoma, and that it is preceded by mydriasis. In primary forms of iritis, myosis is observed. The local treatment of primary iritis consists in the use of mydriatics; *per contra*, in the local treatment of iritis, incident to an attack of glaucoma, myotics are indicated. Without undertaking to explain the *modus operandi*, it is sufficient to note the fact that, all the myotics are attended by diminished ocular tension, whilst all the mydriatics exhibit a tendency to increase ocular tension.

It may be noted in this connection that many diverse opinions have been recently advanced as to the cause of the tension in glaucoma. That which seems to have impressed Dr. Priestley Smith, and in fact a majority of recent writers, is the statement of Treacher Collins, which, though by no means new, is based upon the apparently corroborative evidence that, the so-called spaces of Fontana, in what is now generally called the angle of filtration for the aqueous humor, are occluded by the engorgement of the periphery of the iris, and the coincident contraction of the pectinate ligament upon the posterior elastic layer of the cornea.

Nothing more ridiculously absurd has ever been written in pathology than this baseless hypothesis:

First, the so-called spaces of Fontana are wholly imaginary, being nothing more than the inter-pectineal spaces.

Second, the presence of albuminous matter in the aqueous chambers can not produce increased tension, as may be observed in many forms of traumatism, attended by the escape of blood into the anterior chamber.

Third, the processes of absorption occurring in a normal way, through the lymphatic vessels only, are amply sufficient to remove any albuminous matter from the aqueous chambers.

Fourth, neither the surfaces of the ciliary body, nor the

ciliary processes are able to engage in the processes of secretion.

The aqueous humor is the product of a series of racemose glands found in the projecting part of the ciliary body; it is poured out into the posterior chamber, flowing thence through the pupillary opening into the anterior chamber. A certain equilibrium of pressure is essential to functional activity of all the structures within the globe. If such a condition as the hyper-secretion of aqueous should occur, corresponding hyper-activity of absorption would necessarily follow.

Nothing more ridiculously absurd has ever been suggested than the idea of the phenomena of glaucoma being in any way due to disturbances of either the secreting or osmotic functions of the ciliary body and iris.

It is often observed in the course of mechanical injuries of the ciliary muscles that, increased tension with all the phenomena characteristic of glaucoma, speedily come on. Has it ever occurred to the pathologist that such injuries as bring on œdema, or other effusion of fluid into the ciliary muscle, extending to the ciliary body, or not, must produce at least a perceptible amount of increased tension? Why do we observe peripheral concentration of the field of vision in glaucoma? Is it not clearly due to the extension of œdema or, in other words, the inflammatory effusion from the ciliary body into the contiguous portions of the choroid?

Leaving out all consideration of the traumatic cause, it may be fairly assumed that, the acute attacks of primary glaucoma are not observed in any but the rheumatic or gouty. In all forms of inflammatory rheumatism, the disease begins in the ligamentous or tendinous structures. The ciliary muscle is essentially a ligament binding the ciliary portion of the choroid body to the sclerotica. That it has any other function is mere conjecture. Passing through the ciliary muscle, or ligament, as it was formerly termed, are a series of nerves and small arteries, going to the iris and the projecting parts of the ciliary body. Any disturbance of the circulating blood current in the ciliary muscle is followed quickly by swelling of the muscle and of the ciliary body. This phenomenon is alone responsible for the paralysis of the sphincter pupillæ muscle, which causes it to dilate, for the augmented tension of the eyeball, and for the irregular peripheral contraction of the field of

vision. The increased tension causes the opacity of the refracting media. Pressure upon the nerves passing through the ciliary body gives rise to a sense of pain. The relations of the iris to the cornea can have no possible influence in the production of these phenomena. It is very easily understood anæsthesia of the cornea occurs from the same compression which impairs its transparency. The localized inflammatory process must naturally be inferred from the very beginning of the symptoms. Having produced free catharsis, with profuse diaphoresis and diuresis, the only local treatment which can prove beneficial is section of the iris, which alone will permit free drainage of its engorged and obstructed blood vessels, and indirectly those of both the ciliary muscle and ciliary body.

The experiments of Mackenzie, as early as 1830, demonstrated the futility of paracentesis. If Priestley Smith and Treacher Collins are correct in their assumptions that, excessive aqueous secretion causes the phenomena of glaucoma, evacuation of the aqueous should afford the corrective drainage, and at least diminish or retard the processes of destruction in cases of inflammatory glaucoma. As a matter of fact, evacuation of the aqueous humor has not been found beneficial. Sclerotomy fails because the divided structures soon reunite, and the glaucomatous processes return, usually in an aggravated form, although it may be said in some cases, the subsequent progress of the disease has been retarded. The influence of iridectomy is more likely to be permanent, because the area of divided tissue remains permanently open.

The reason atropin, more than any other mydriatic, provokes attacks of glaucoma in predisposed subjects, may be found in the prolonged effects of the mydriasis upon the coats of the arterioles in the ciliary muscle, keeping up a degree of pressure upon the ciliary nerves sufficient to bring on œdema of the muscle. The reason, therefore, why such myotics as eserine and pilocarpine are beneficial in incipient forms of glaucoma may be found in the prolonged contraction of the arterioles passing through the ciliary muscle, allowing a more complete circulation of the blood current, and tending to prevent that sluggish state of circulation which allows effusion of germs through the walls of the capillary blood tubes. Schlemm's canal is known to be occupied by a plexus of veins, carrying the blood from the iris and contiguous portions of the

ciliary muscle and ciliary body. There are no lymphatic vessels in this sinus. Veins take no part in the work of absorbing fluids, excepting at their points of beginning, just where the capillary tube terminates in the venule, at this point are one, two or three minute valvular openings, which receive fluid of less density than the blood. The processes of absorption occur through the agency of what are called wandering cells, traversing the intravascular spaces, and entering the capillary lymph tubes of all the tissues of the body; these pursue their course to the large lymphatic vessels, and those portions of the lymph stream not used up, in the passage to the glands, are destined eventually to re-enter the blood stream through the right subclavian vein, just as the digested food comes from the intestinal surfaces, through the thoracic duct, into the left subclavian.

It may be fairly assumed that, catalysis must be established as the chief, or the prime factor in the termination of an attack of glaucoma. Defibrinizers and depurants are the agents to be employed; with section of the tissues in confined areas within the limits of restricted circulation.

CHRONIC GLAUCOMA.—The phenomena of chronic glaucoma differ from those of the acute variety, in the very mildness and insidious nature of the invasion, and correspondingly in the obscurity from a faintness and uncertainty of the characteristic symptoms. The cupped disc, which speedily appears in suddenly developed and high grades of ocular tension, may be so indistinct in the chronic forms as to escape detection. It is in the chronic stages of glaucoma, which have come on insidiously, that the increased presbyopia appears. It is in this class that those visual disturbances, such as halos surrounding lights, and the imperceptible diminution of the field of vision, goes on until one half, or more, may have been blotted out before the subject is aware of the existence of the disease.

In debilitated subjects, and in neurotic people, chronic incipient glaucoma most frequently occurs. There can be little doubt that the prolonged ciliary irritation of astigmatics and myopes, given to night work, may bring on an insidious or chronic glaucoma. The same may be said of chronic dyspeptics, whose occupation involves prolonged use of the eyes when the nerve centers are disturbed by toxins in the blood. Systematic attention to dietetics, bathing, exercise and the mental

condition demand the first attention in the treatment of such cases. Iridectomy in these cases is rarely, if ever, necessary. Myotics are more important in this class than in the acute forms. The so-called tonic drugs, as iron, strychnine, diffusible stimulants and alcohol are all more or less pernicious, as tending to augment blood pressure through exalted nerve force; whilst some of these agencies retard elimination and are, therefore, more objectionable than others.

It has been found that, in anæmic subjects, both the salicylates and the muriate of pilocarpin may be given in sufficient quantities, and continued to the production of their therapeutic effects, by associating with them fluid foods, as nutritive broths, beef tea, malted milk, etc. If nocturnal headaches accompany the tortuous retinal veins, the dull aching in the eyes, peripheral contraction of the field of vision, even though ocular tension may be absent at the time of examining the patient, the iodide of potassium, in doses of one or two grains, in one half pint of water, every two or three hours during the day, frequently yields brilliant results.

Acute glaucoma is nearly always due to rheumatism, gout, mydriatics or traumatism, and in every instance begins in the ciliary muscle.

The aqueous humor has nothing to do with either the origin or the course of glaucoma. The relations of the iris to the cornea are utterly insignificant, excepting in so far as they may be related through peripheral iritis, incidental to cyclitis.

Increased tension in glaucoma is always the result of inflammatory effusions into the ciliary muscle and contiguous structures, or a slowly developed hyperplasia.

Contraction of the field of vision is probably due to the invasion of the periphery of the choroid by inflammatory effusions extending from contiguous structures.

The tortuous retinal veins and cupped disc are the natural results of augmented pressure upon the nerve structure and the blood vessels against the lamina cribrosa.

The indications for treatment are, such eliminating agents as will reduce blood pressure, and the permanent drainage of the vessels in the constricted areas of contiguous structures by section of the iris. Iridectomy done for this purpose should always be of small extent, including a portion of the sphincter pupillæ muscle, and extending to the periphery of the iris.

The general condition of the patient is of the first importance. Active elimination, alimentary, renal and cutaneous, should be maintained from the start. Eserin or pilocarpin should be instilled into the eyes, provided approximately complete myosis can be secured. Where myosis can not be obtained in half an hour from a single instillation of sulphate of eserine solution, or pilocarpin, in the proportion of one grain to the ounce of water, iridectomy is indicated. Otherwise myotics should constitute the only local treatment. It is hardly necessary to say smoked glasses should be relied upon for protecting the eyes from light.

The patient should, at no time, be permitted to remain long indoors. It is always best to have more or less exercise on foot; this not only promotes digestion and facilitates all the processes of elimination, but it serves at the same time the very useful purpose of diverting the mind of the patient. Easily digested, nutritious foods, without highly stimulating condiments, should be administered regularly and systematically. Copious draughts of pure water should be insisted on, at stated intervals, if necessary. The use of pepper, spices, teas and all alcoholics should be rigidly inhibited. Such drugs as *nux vomica*, *kola*, *asafoetida*, and all cerebro-spinal stimulants should be avoided.

If glandular enlargements, eruptions of the skin or periosteal nodes exist, the iodide of potassium, in doses of two or three grains to a half pint of water, may be administered every hour or two, with beneficial results.

If the tongue is pale and relaxed, and the patient complains of muscular languor, an occasional dose of ten or fifteen grains of the sulphate or salicylate of quinine may be given, with a half pint of beef tea or malted milk. All the glucoses should be forbidden, because they augment the volume of the lymph stream. Electricity, so much praised by some, in chronic glaucoma, has never failed to do mischief, where I have known it tried.

Individual environment must be taken into account as it will often suggest peculiar modifications of the principles of treatment outlined herein.

SAMPLE MISSTATEMENTS IN A BOOK FOR OPTICIANS.

BY DAVID W. STEVENSON, M.D., RICHMOND, IND.

IT is proper that the physiologist should at times examine and even criticise the books on Physiology intended for public schools and teachers. Likewise it is to be expected that the obstetrician should review the works intended for midwives. It is not in place to state that midwives, like the Indian, are a dying race. The better education the midwife and public receive the sooner the doctor is called and misfortune prevented. It at least will be of some interest, and perhaps service, to the oculists to examine the heresies that may be found in a much advertised book for opticians. It may explain some of the ignorant instruction our patients may have received and assimilated.

OPTICAL TRUTHS. By CHAS. McCORMICK, M.D.,
President of McCormick Optical College, 84 Adams Street, Chicago.

The Keystone reviewed this a short time ago and says the optical truths (?) are stated very clearly. It has been recommended to me by two wholesale opticians as the coming book on optics. As I can not find Dr. McCormick's name in any of our medical directories as a graduate from any reputable medical colleges, I will withhold commend as to his being an M.D. The book has no preface but is dedicated to "the sweet spirit, who has been, is, and ever shall be my *inspiration*." The work commences with an introduction as follows:

"In the practice of ophthalmology one of the essentials is a general knowledge of the nervous system, what it is, whence *it cometh* and whither *it goeth*. In structure it is a series of tubular membranes containing in a minute and continuous *stream*, matter *identical* with the brain substance, through which electrical energy is transmitted. This energy is of two kinds, *galvanic* and *faradic*. The first is generated by the *digestive* organs, and is constant; the second, is an intermittent current generated by molecular friction throughout the body. The nervous system is divided into two classes, the cerebro-spinal or *animal*, and the sympathetic or *organic*."

It needs an active imagination to suppose that the terms

of mechanical electricity may be applied to the body. But this book published in 1898 (near the end of this wide-awake nineteenth century) is largely interwoven with the rankest physiological bosh.

Just here we may look at a sample of the definitions he has given in a separate glossary. In some of these cases there may be seen a slight allusion to *derivations* but absolutely nothing to *definitions*, although this is an age of good *dictionaries*.

"Anæmia—A condition of wasting.

Embolism—A rupture.

Glioma—Glue.

Leucoma—White.

Stroma—Bedding.

Horopter—The field of vision included by both eyes without moving."

The last definition would give an idea that the horopter was the visual field which could be measured with a perimeter. A horopter is the surface of all points seen singly by the two retinae when the eyes are joined in fixing one point.

He also gives a list of questions and answers to be studied by the reader. Samples:

"Q.—What is light?

"Ans.—It is a force positive and *negative*.

"Q.—Which meridian of the cornea has the sharpest curvature in the normal eye, and why?

"Ans.—The vertical, to give the effect of a plus cylinder to act as a governor to the oblique muscles!

"Q.—Give some symptoms of hyperopia.

"Ans.—Constipation, indigestion, piles, female disorders, almost all nervous disorders, visions more acute than $^{20}/_{xx}$ (!), while myopia has absence of hyperopic symptoms.

"Q.—Why not use prisms for muscle trouble?

"Ans.—Because it is foolish almost to criminality.

"Q.—How much accommodation can one have?

"Ans.—Three dioptries.

"Q.—What is the difference between errors of refraction and muscular insufficiencies?

"Ans.—The first are deformities, and the second is weakness resulting from these deformities."

The author does not explain how emmetropia has these resulting weaknesses.

In referring to refraction he states "there are breaks but no bends." In comment on this I would say, light, in passing through the crystalline lens, does bend, and any study of refraction, to be consistent, ought to be considered from the wave theory and not the old ray theory.

Dr. McCormick advertises: "Our fogging system of testing eyes without atropine is simply a mechanical method of coaxing the ciliary muscle to rest." The term fogging is a very poor one, because a cylinder or a concave lens can cause this so-called 'fog' just as well. Yet several American authors of the irregular type have taken credit to themselves for the name and its application. European and American oculists have long used it. Thus I refer to Morton's (London) little work on "Refraction of the Eye," now in its fifth edition, in which he describes much more clearly and concisely than McCormick, this method. I quote from Morton:

"A method of assisting the patient is to let him put on a pair of + 4 D. glasses for ten or fifteen minutes, and then, without removing, gradually neutralize them by stronger and stronger concave lenses placed in front, until those are found with which the patient can see in the distance the smallest possible type. The manifest hyperopia is apparent by difference in lenses, although atropine is the only safe way to remove all uncertainty."

McCormick speaks of using a + 3 instead of + 4 and this is the only difference. He states this will give the spherical part of correction without atropine. I find he does not mean what he says, for he adds concave cylinders to this to get the astigmatism. Spherical correction has reference to the meridian which is nearest emmetropia. His so-called spherical correction is obtained complete, without the least reference to the astigmatism, which is preposterous. Moreover, he gives advice to stop neutralizing when the vision is almost as good as when the patient can see without glasses. Thus, if the patient could see $\frac{20}{LXXX}$ without a lens he would claim the spherical correction was obtained when $\frac{20}{LXXX}$ or even $\frac{20}{LXL}$ was seen without reference to the astigmatism. Ridiculous!

Instead of stopping at the strongest meridian the patient may stop midway between the two meridians. Thus, with + 2 D. \bigcirc — 1 cyl. ax. 45° the patient may stop at 2.50 D. In this case the diffusion image becomes a circle and the lines in

the clock may appear all alike, although the author states dogmatically, if all appear equally distinct the astigmatism is at most very slight. He advises using the stenopæic-slotted disc which is altogether out of date with intelligent American oculists as a final test. Thus, in the case mentioned of $+2\text{ D. } \textcircled{C} +1\text{ cyl. ax. } 45^\circ$, if the lens is $+2.50\text{ D.}$ which is the spherical lens that probably would be used, the slot would probably stop near 90° , halfway between the meridians, as this section of cornea would be the one nearest correction. The slit hardly ever gives the axis exactly, and as there are at least four great objections to its use, it is surprising that it is still advised in an 1898 text-book.

The above notes may partly explain why so many opticians fall down on astigmatism, especially to be seen in oblique cases. As to spherical correction, they stop before the patient gets full vision, or they buy a machine fixed to overcorrect from one-half to one dioptré, and thus in some cases they overcorrect and in others undercorrect. It is deemed the height of wisdom to add to their correction so as to be able to say they even get more than under atropinizing (McCormick).

As a sample, we will note his advice to be found on page 63: "If $- .50\text{ D. ax. } 90^\circ$ gives $\frac{20}{xx}$ vision, prescribe $+ .50\text{ D. ax. } 90^\circ$ if it gives $\frac{20}{xxx}$ vision, even if the first was found under a mydriatic." Here is a man, president of an optical college, and supposed to have some optical education, who actually proposes in a case of astigmatism, *against the rule*, to correct it as if it were astigmatism *with the rule*.

In regard to muscle troubles he makes such puerile statements as the following: "The eyes in muscular insufficiencies always deviate the same way the lights do."

"If the *base* of the prism is towards the nose it proves the internal recti are too active. The weak muscles are always under the apex of the prism."

He states that he is aware that in regard to the tests for exophoria, he stands alone, "but all the evidence supports my position."

He draws a curious diagram dividing the lens into two prisms and selects the portion to suit his whim, and forces the ray through that.

He admits that in actual cross-eyes facts oppose him, but says there is a limit angle before coming to that. The *cover-*

test ought to show any reasonable man how the eyes turn.

He states, glasses have often wonderful cosmetic effects, removing wrinkles, etc. "The contraction of the sphincter muscles throughout the body in hyperopia causes menstrual difficulties in females, and piles in both males and females. Glasses will remove these" (!). "If a patient has $20/_{xx}$ vision he has no disease which affects the eye."

Any oculist finds serious diseases of the eye often with as good vision as that. I am now treating a patient whose fundus is spotted like a checker-board from an old syphilitic chorio-itis whose vision is often better than $20/_{xx}$ but with relapses.

"After the eye has matured, at 10 years of age, if the correction is equal to the error *no* changes of lenses will ever *be needed*." A great mistake, as even the batting of the lids may change the shape of the eye in a few years.

He devotes a chapter to "Exposing Ophthalmological Charlatans and Their Practices," and takes as his motto: "There are tricks in all trades but ours." He refers to the "indirect method" as though it was a humbug, by which, at best, only an inverted image can be seen. The microscope and telescope use an inverted image and yet they are used!

"The cause of most cases of conjunctivitis is hyperopia, which causes the sphincter nerves and muscles at the mouth of the Meibomian gland to contract, and the matter is forced back between the conjunctiva and lids which become *granulated*." McCormick could probably not explain how granulated lids are almost unknown in some places and among some races. Yet he rants about the gross criminality and ignorance of those who use escharotics on granulated lids. "It is a crime against Nature."

On page 85 he states: "There is a publication which advertises itself as the greatest of its kind, and says 'its editors and contributors are the cream of the profession.'" "On page 5 of its January, 1897, issue, the *Ophthalmic Record* has a contribution under the heading 'Metamorphopsia,' in which seven cases, measured under atropine, are recorded and the lenses prescribed are given." There were also cases of anisometropia as described by a Tennessee writer. He, of course, did not give full correction but merely gave what the patient accepted. McCormick spends two and a half pages and a dozen diagrams to prove that the eyes were not corrected! He then adds: "If

such are the cream of the profession, for humanity's sake, let us have skimmed milk."

He mentions a prescription "from one of the experts at the Illinois Eye and Ear Infirmary. It was written on one of the cards of admission to the poor: R. V. $\frac{20}{xxx}$, L. E. $\frac{20}{L}$, and the two meridians were shown on a cross. It was sent to me by an optician for interpretation. I presumed the patient was the victim of a retinoscope fiend and that the lines meant the meridian of the eye. But I suggested that as vision was so much worse with the right, it was evident the prescription was not an approximation." A queer conclusion that one eye could not be $\frac{20}{xxx}$ and the other $\frac{20}{L}$. This was not a prescription at all but probably a memorandum of part of a test which the patient had got hold of. The Infirmary had better trade with some optical house that can telephone for full directions rather than have to depend on such an adviser.

He devotes a chapter to "Operations, Medicines, and Prisms—Three Great Blunders." He has no use for these, as he thinks headache, insanity, dyspepsia, piles, nervous prostration, and female diseases can be cured by correcting with a convex glass the hyperopia.

Just here he gives another example of his fantastic mathematics: "A hyperope of 2 D., in order to focus light from infinity upon the retina, must accommodate 2 D., and the normal tendency to converge to the twenty-inch point, with that much accommodation, would cause diplopia but for the demands of the 'guiding sensation' which calls for sufficient power to be sent to the external recti through the sixth nerve to prevent that convergence. This requires, at least, 2 D. of nerve force, thus we have 2 D. accommodation in each eye, 2 D. convergence and at least 2 D. to restrain that convergence, making a total of 8 D. per second. So figuring, as in the other example, we have $8 \times 60 = 480$ D. per minute; $480 \times 60 = 28,800$ D. per hour; and, as the hyperope uses his accommodation all the time, for sixteen hours daily, we have $28,800 \times 16 = 460,800$ D. per day. Thus, if he has the same work to do as the emmetropic, we add the 97,200 D. to the 460,800 D. making a total strain upon the nervous system of the hyperope of 558,000 D. daily. Compare this with the normal 97,200 D. The extra 460,800 D. must come from the reserve supply stored in the brain, and when that is exhausted trouble begins."

Shades of the Keeley motor! If some soldier could have extracted some spare 558,000 D. from the brain of some optical pseudo-professor it might have helped in demolishing the whole Spanish fleet. His mathematics are more whimsical than the opposite idea which says a 2 D. of hyperopia represents an eye too short by only one-half a millimeter or less than one-fiftieth part of an inch and therefore of not so vast an importance.

Here is another outburst of wisdom: "I will make the broad assertion that as long as sufficient vitality remains to keep the afflicted out of bed, even in chronic diseases, the correction of the hyperopia will effect a complete cure in 90 per cent. of all cases." As to hyperopia, he asks, "if such unnatural effects would not be in proportion to the amount of error." He says, emphatically, "Yes." In this McCormick is much astray. Patients with a + 8 D. hyperopia may not have any eyestrain or headache which may be so prominent in cases with + 1 D.

In his chapter on "Diseases of the Eye," he states that "keratitis and iritis are due to errors of refraction." He says, "in glaucoma the disc is of greenish hue, hence the name glaucoma (green)." The word glaucoma has no reference to the optic disc but merely to the reflex which may be seen in many conditions with a dilated pupil and slightly dimmed media. It is a very mischievous doctrine for McCormick to give the impression that the disc or anything else is always green in glaucoma.

He speaks of inflammation of the retina being due to sympathy. "This is called retinitis. It is not a disease, but a *symptom!*"

In reference to the ophthalmoscope he states: "The operator should first familiarize himself with the appearance of the *normal* retina (see cut)." He gives two nearly full-page plates, both alike, except one is cheaply colored. On both there are some thirteen *retinal* vessels which do not reach the optic disc but spring up from all parts of the retina. Whoever made these plates never saw a human retina, and I know of no animal that has such odd retinæ as here figured. The coloring on a tomato-can would excell in faithfulness.

He says the "absence of the light streak in the veins is due to the opacity of the blood which absorbs the light." It

further strengthens me in the idea that the author never saw a human retina, as he would have seen the light streak on veins during his earliest examinations.

In speaking of "thread-like vessels, pale arterial blood, and dark venous with general appearance of lack of proper nourishment," he says, "it indicates disorders of the generative organs in females and functional derangement of the liver and digestive apparatus generally in males." Some men are visionary on the subject of female organs. Surely what would affect the liver and stomach in man would affect the same in woman. He states "the *commonest* cause of female ills is hyperopia and ignorance of their functions."

On page 112 he states: "In hyperopia the constant accommodative effort causes a sympathetic contraction of the sphincter muscles throughout the body (and it must be remembered every opening in the body, large or small, is surrounded by such a muscle), among them that of the uterus, thus interfering with the menstrual function. This sets up a disturbance which is reflected back to the eye, causing further contraction of the muscles there, even to those surrounding the optic nerve at its entrance, with the result that the arterial circulation is cut off so blood can not enter the eye, venous circulation is impeded so blood can not pass out, and the field around the edge of the disk becomes so irritated that the disk appears like a splash of cheap whitewash, tinted. The cut was drawn from such a case." In comment, it is in place to say there is no sphincter-muscle surrounding the optic nerve papilla. A full-page colored plate at the beginning of the book represents a cartilaginous cushion closely hugging the optic nerve in immediate connection with the eye. This cushion is attached to nothing except the recti muscles which are extremely short, not half the circumference of the eye. It would be a surprise to the Doctor to know that the optic foramen is an inch behind the eye and that there is no sphincter cushion surrounding the nerve at the papilla.

The cut which is supposed to represent the effects of hyperopia is really that of a serious disease, *choked disc*. The striation of the nerve is enormously increased and the margin of the disc can not be made out. This is fine teaching for students! Many an eye in such cases would be forever lost through a few weeks' delay with glasses and ignorant pre-

sumption. Sad to relate, every oculist has the histories of just such cases, who have lost their sight irretrievably while wasting time trying several changes of glasses.

In speaking of patches in the eye, he says "if these appear black, as they will when the degenerated tissue disappears, showing the pigment layer, it is safe to predict death. If your prediction fails, the patient is pleased, and if it is fulfilled, your reputation is enhanced." Comment: It is safe to doubt, the patient will be pleased when he may find from any oculist that pigment spots both in retina and choroid, have nothing to do with prognosis as to death.

McCormick states there are no nerves in the sclera. Königstein, as early as 1881, gave an accurate description of the scleral nerves. Dr. McCormick also describes "the zone of Zinn as a tubular structure." This is an exploded fallacy!

In his chapter on "Color-Blindness," he tries to prove with a diagram that color-blindness is due to the fact that the lens is not achromatic. He states that it is impossible to find a color-blind person with $\frac{20}{xx}$ vision. I have found them with $\frac{20}{x}$ vision and so have other observers. A lens that is not achromatic would not change monochromatic light. Thus, a red-blind person in a red room lighted by a red light would not perceive the redness, although a lens not achromatic could have no such effect in causing the trouble. He states that the only modern method of testing color-blindness is a method devised by one of his assistants; Prof. Rumble's method by rotatory circles is a very poor and imperfect imitation of Jeaffrieson's color circle, an English invention.

Dr. McCormick has a statement on the last page of the book that his college gives the most thorough course of optics in the world. Commencement, \$40, graduation and diploma all in a week.

I have given but a few of the many heresies which the book contains, but which an innocent public may be supposed to assimilate.

A CASE OF ATROPHY OF THE OPTIC NERVES
FOLLOWING HÆMORRHAGE FROM THE
STOMACH, WITH A CONSIDERATION
OF THE CAUSES OF POST-
HÆMORRHAGIC
BLINDNESS.

BY SAMUEL THEOBALD, M.D., BALTIMORE, MD.,

CLINICAL PROFESSOR OF OPHTHALMOLOGY AND OTOTOLOGY, JOHNS HOPKINS UNIVERSITY—OPHTHALMIC AND AURAL SURGEON TO THE JOHNS HOPKINS HOSPITAL
AND TO THE BALTIMORE EYE, EAR AND THROAT CHARITY HOSPITAL.

LOSS of vision as a consequence of hæmorrhage from the stomach is an occurrence of sufficient rarity to warrant the reporting of every well-authenticated case of this character. In a paper on "Amaurosis and Amblyopia after Hæmatemesis," by Dr. Ed. Pergens, of Brussels, in the January, 1896, number of the *Annales D'Oculistique*, the author, after a seemingly exhaustive search of the literature of the subject, has been able to bring together data of but sixty-four cases, two of these being newly-reported cases of his own.

The unanimity with which the text-books upon diseases of the eye mention excessive hæmorrhage, and especially hæmorrhage from the stomach, as one of the causes of optic neuritis, would seem to indicate that cases of this character are not of infrequent occurrence—a conclusion scarcely warranted, I am inclined to believe, by the facts.¹

Briefly reported, the case which has recently come under my observation, is as follows:

A. B., 57 years of age, formerly a lumberman of West Virginia, and more recently a restaurant-keeper in one of the small towns of that State, was seen December 5, 1898. He gave a history of serious disturbance of the stomach of twenty years' duration, the most prominent symptom being frequently repeated attacks of vomiting. On May 6 (1898) he had, for the first time, a hæmorrhage from the stomach. It was of a severe character, and was followed, at intervals of forty-eight

¹I have been able to find in the Catalogue of the Surgeon-General's Library, under the title "Inflammation of the Optic Nerve," but a single reference to optic neuritis following hæmorrhage.

hours, by two other equally severe hæmorrhages. The loss of blood was so great that his life was despaired of, and he was confined to bed for six weeks. For part of this time (two or three weeks), according to his account, he was in a semi-conscious state—was aware of the presence of people about him and could hear their voices, but could not speak to them or express his wants.

On the day of the second hæmorrhage, his sight, which had previously been good, became greatly impaired, and his belief is that during the two succeeding weeks he was "entirely blind." At the end of this period his vision began to improve, and he was able to see people moving about the room. This improvement in vision continued, so that by the last of June or first of July he could see well enough to walk upon the streets without guidance; and this amount of vision he retained until about the middle of November, when his sight began again to decline. The decline from this date was pretty rapid, so that when I saw him he had to be led about like one entirely blind.

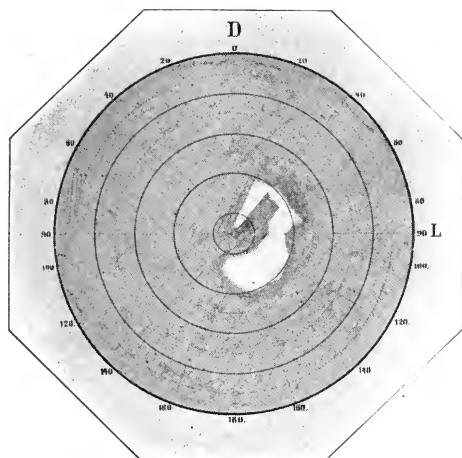
He admitted that he had been a pretty constant smoker, but denied having been a hard drinker, and also denied having had syphilis.

The condition of his stomach was carefully investigated by Dr. Osler and Dr. Thayer, who found a nodular mass near, and partially occluding, the pyloric orifice, which they regarded as the result of a chronic ulcerative process, the indications pointing to a more recent development of a malignant growth in the old cicatricial tissue.

The examination of the eyes gave results as follows: Pupils semi-dilated, somewhat oval in shape and entirely unresponsive to light. The ophthalmoscope showed advanced atrophy of both optic nerves, with some cupping, and marked contraction of the retinal arteries. The optic discs had a woolly appearance, their outlines were irregular and ill-defined, and in each eye there were pigment changes in the retina, not only about the margin of the disc but at points some distance from from it and especially in the macular region, indicating that the atrophy of the nerves had been preceded by an inflammatory process which had involved the retina as well as the optic nerves. Upon testing his vision, I found that with each eye he was able to count fingers at about 12", but only in a very lim-

ited part of the field, which in each eye was slightly to the temporal side of the central fixation point.

After an interval of eight days, he having meantime been under treatment in the Johns Hopkins Hospital, he thought his sight somewhat better, and I found that he could then distinguish with each eye Snellen C. at about 10''. An attempt was made at this time to take his visual fields; but this was very difficult and the result unsatisfactory because of his macular blindness and consequent inability to maintain central fixation. The result obtained in the right eye is shown in the accompanying diagram; the attempt as to the left eye was



abandoned. Although there seemed but little probability that his sight could be improved by any plan of treatment, he was placed upon small doses of hydrarg. biniodid. with potassium iodid., and increasing doses of strychniæ sulphas.

Although, as has been said, the text books, almost without exception, speak of loss of sight following severe hæmorrhage from the stomach, usually ascribing this result to optic neuritis, they have but little to say as to the way in which the loss of blood induces such disturbances in the visual apparatus.

The theory, advocated by Samelsohn² and others, that the optic neuritis is not due to the loss of blood, but that it and the diseased condition of the stomach which induces the hæmatemesis are both dependent upon a central lesion, probably

²Graefe's Archives, Vol. XXI, No. 1, p. 150.

in the optic thalamus, does not seem to be tenable; for we know that other severe hæmorrhages as well as those from the stomach are followed by loss of sight. Thus Fries³ states that while 35.5 per cent. of the reported cases of amblyopia from loss of blood were due to hæmorrhage from the stomach and intestines, 25 per cent. were due to uterine hæmorrhages, 25 per cent. to abstraction of blood, 7.3 per cent. to epistaxis, 5.2 per cent. to bleeding of wounds, and 1 per cent. each to hæm-optysis and hæmorrhage from the urethra.

The theory of Westhoff and Ziegler, that the loss of vision is caused by a primary fatty degeneration of the optic nerve induced by ischæmia, as well as that of Hoffman, who attributes the amblyopia and the subsequent atrophy of the optic nerve to a retro-bulbar neuritis, seem to have received but little support from the evidence afforded by the ophthalmoscope in the majority of the reported cases.

In the paper of Pergens, already referred to, a brief abstract is given of each one of the sixty-four cases of amaurosis and amblyopia following hæmatemesis which he was able to find upon record. In a considerable number of them no ophthalmoscopic examination was made; in forty-three instances the ophthalmoscopic findings are given, but the time at which the examination was made varies greatly in different cases.

If we decide, arbitrarily, to regard all the ophthalmoscopic examinations made within three weeks of the onset of the eye symptoms as *early*, and all after this period as *late* examinations, it will be found that twenty of the forty-three cases belong in the first category and twenty-three in the second. The early examinations are, of course, the more instructive.

Now, after a careful consideration of the findings in these earlier examinations, it seems to me that, while a very few of them might, perhaps, be cited as supporting the theory of primary fatty degeneration of the optic nerve of Westhoff and Ziegler, the great majority of them point strongly to an obstruction of the blood current in the central retinal artery as the cause of the subsequent intra-ocular manifestations; and, in view of the well-recognized tendency to the formation of thrombi in post-hæmorrhagic anæmia, it seems highly probable, if this theory be correct, that the obstruction was of thrombotic origin. This

³Klinische Monatsblätter für Augenheilkunde, 1878.

seems the more probable, because there is, I believe, a reason why the disposition to thrombosis after loss of blood should manifest itself especially in the retinal vessels.

The occurrence of thrombi after excessive hæmorrhage is to be explained by the reduction of blood pressure and the consequent slowing of the blood current, the alteration in the condition of the blood itself (especially the multiplication of the platelets) and, probably, also by changes (consequent upon anæmia) in the vessel walls. Now, in the retinal circulation, beside all these general conditions, we have, in the intra-ocular tension, a special condition tending further to obstruct the enfeebled blood current. Here then, it would seem, at the point where the central retinal artery pierces the lamina cribrosa and becomes subject to the intra-ocular pressure, the ideal conditions for the development of a thrombus exist; for here we have the especial point of constriction or obstruction behind which, when other conditions are favorable, a thrombus is prone to develop. The intra-ocular pressure, doubtless, impedes the blood stream in the retinal veins also, but, probably, not to the same degree as in the arteries.

The ophthalmoscopic picture in thrombosis of the central retinal artery is much the same as is found in embolism of the artery, namely, paleness of the optic disc, marked contraction of the retinal arteries, less marked contraction of the veins, opacity of the retina, especially about the disc and the macula, a cherry-colored spot at the macula, and, occasionally, hæmorrhages; indeed, there are grounds for believing that many of the cases which in the past have been regarded as *embolism* of the central artery of the retina were, in fact, cases of *thrombosis*.⁴

Having in mind this picture, let us consider, more in detail, the ophthalmoscopic findings described in Pergens' paper and see in how far the two agree. In the twenty earlier examinations, which, as before stated, are the more instructive, we find recorded the following conditions:

	CASES
Arteries contracted.....	5
Vessels contracted, especially arteries.....	2
Vessels contracted.....	2
Arteries filiform, veins very thin	1

⁴KERN, Zur Embolie d. Art. centr. Retinæ. Inaug. Diss, Zürich, 1892.

Arteries contracted, veins dilated.....	3
<hr/>	
Total in which there is mention of contracted arteries.....	13
Optic disc pale.....	11
Optic disc greenish-grey.....	1
Optic disc clouded.....	2
Optic disc clouded and white.....	1
<hr/>	
Total in which there was ischæmia of the disc.....	15
Cloudiness of the retina.....	7
Cloudiness of the retina with cherry-colored macula.....	2
White plaques, miliary exudates, etc., in retina.....	3
<hr/>	
Total in which there were characteristic changes in the retina.....	12
Hæmorrhages in retina or upon optic disc.....	8

Here we have, in at least three instances, the typical picture of obstructed arterial circulation—the case in which the arteries were filiform, and the two cases in which there was clouding of the retina with the red spot at the macula—and in all of the others it is safe to say, I think, that the conditions present may be accounted for more satisfactorily upon this theory than upon any other.

Besides these there are two cases in which the retinal vessels are described as normal (vision being recovered in each); one in which the arteries were slightly enlarged and tortuous and the veins greatly so; one in which the veins were dilated and hæmorrhages were present in each eye; and one in which there was a picture of “arrested circulation,” all the retinal vessels being increased in size. In the three last-mentioned cases the indications point to interference with the venous circulation rather than with the arterial. This might be explained by the occurrence of a hæmorrhage into the sheath of the optic nerve, as suggested by Samelsohn, or by thrombosis of the central retinal vein, although it can not be said that the characteristic signs of this latter condition were present in any of these cases. In this connection, however, it is of interest to mention a case of marked impairment of vision following a severe uterine hæmorrhage, observed by Dr. Harry Friedenwald, of Baltimore, in which the ophthalmoscope showed in

each eye the typical picture of thrombosis of the central retinal vein. The vision of one eye was regained, but that of the other was permanently lost.

As to the evidence afforded by the ophthalmoscope in the twenty-three cases described by Pergens, in which only a late examination was made, it can not be claimed that it throws much light upon the question under consideration; for the atrophied nerves and contracted arteries usually mentioned as present might have been due to other conditions as well as to thrombosis of the central artery, and this is equally true of the case which I have reported.

The character of the visual field in my case, as well as that in several of the small number of cases in Pergens' paper in which the field is described (vision having been retained only in a circumscribed area in the temporal field) is significant, and seems to point to the partial preservation of the retina in the neighborhood of the papilla by means of the cilio-retinal arteries.

Of the whole number of cases collected by Pergens, autopsies were made in but four. In one of these a thrombosis of the splenic artery was found, but no mention is made of the condition of the eye. In a case reported by Hirschberg⁵ there was complete atrophy of the optic nerve of one eye, and atrophy of a limited portion of the optic nerve of the other eye. In the affected portion of the nerve there were numerous blood vessels with thickened walls, but no thrombosis and no signs of hemorrhage in the optic nerve sheath. The death of the individual, it should be stated, did not occur until three years after the loss of vision.

In an autopsy by Ziegler,⁶ twenty days after the attack which led to loss of vision, no macroscopic changes in the optic nerves or their sheaths were found; but the microscope showed fatty degeneration of the nerves and their intra-ocular expansion.

The only other autopsy was one made by Raehlmann.⁷ All the arteries presented constricted lumens from a fibrous endarteritis. The veins also had undergone slight constriction,

⁵*Zeitschr. f. Klin. Med.*, Vol. IV.

⁶*Ziegler und Nauwerck's Beitr. z. path. Anat.*, Vol. II.

⁷*Fortschr. d. Mediz.* 1889, p. 928.

in two places being almost totally obliterated. There was œdema of the retina, especially in the neighborhood of the disc. In the choroid the endarteritis was pronounced and there was hyaline degeneration.

Here, too, it will be seen, we have mention of vascular changes, the thrombosis of the splenic artery in the first-mentioned case being, at least, suggestive, and the condition of the retinal vessels and the retina itself in Raehlmann's case being especially significant.

The fact that both eyes are so frequently involved in blindness depending upon acute anæmia⁸ seems, at first sight, to work against the theory that the loss of vision is due to thrombosis of the central retinal artery, since it implies the occurrence nearly simultaneously, at different points, of two thrombi; but, if the intraocular tension plays as important a rôle in the etiology of these cases as I believe it does, this objection loses much of its force.

CONCLUSIONS.

That the weight of evidence afforded by the ophthalmoscope points to thrombosis of the central retinal artery as the usual cause of the blindness which occurs in post-hæmorrhagic anæmia.

That the resistance offered to the already enfeebled blood current in the central retinal artery by the intraocular tension is an important etiological factor in determining this result.

That, in exceptional instances, the ophthalmoscope indicates that the thrombosis occurs not in the artery but in the central retinal vein.

That, in other exceptional instances, it may be that the loss of sight and the ophthalmoscopic changes which accompany it are the result of a hæmorrhagic or serous effusion into the optic nerve or its sheath (Samelsohn). And here, again, the obstruction and damming back of the blood current in the central retinal artery by the intra-ocular tension, probably, have much to do with bringing about this result.

⁸Whether one or both eyes were affected is stated in fifty-seven of the cases collected by Pergens. Of these both eyes were involved forty-nine times; one eye only eight times.

A CASE OF ATYPICAL RETINITIS PIGMENTOSA¹.

BY HOWARD F. HANSELL, M.D., PHILADELPHIA, PENN.

THE report of the case briefly described below was suggested by the article by Fuchs in the *Archives of Ophthalmology*, September, 1898, and is offered as a small contribution to the subject of hereditary atrophy of the optic nerve, retina and choroid. Until the appearance of Cutler's paper, *Ibid.*, July, 1895, in which four cases of hereditary night blindness studied in Fuchs' clinic were reported; all cases of this kind were classified under the general title of retinitis pigmentosa, but Fuchs has shown that this disease is only one form of the affection. He has described retinitis albescens, circular atrophy of the choroid, retina and degeneration of the optic nerve, and others have reported cases of retinitis pigmentosa without pigment. All have practically identical clinical histories and symptoms but differ in their ophthalmoscopic appearances. They are characterized by night blindness—the earliest symptom, by progressive atrophy of the retina, absorption of the retinal and choroidal pigment, and wasting of the optic nerve. This classification and a further elaboration of it seems to me a desirable advance in our studies of diseases of the eye-ground in young subjects. We have been accustomed to name the diseases according to their ophthalmoscopic findings only, and have omitted the important consideration of their histories and pathology. Thus, a single large patch of choroidal and retinal atrophy is called "choroiditis areolaris," numerous isolated patches "choroiditis disseminata," etc. These expressions convey an idea of the ophthalmoscopic findings only, and disregarded the underlying causes, family and personal history, complications, course and final outcome.

Wagenmann, *Graefe's Arch.*, Bd. XXXVI and XXXVII, states that in pigment degeneration of the retina the initial disease is choroidal, and since the retina, or at least its posterior layers depend upon the choroid for its nourishment, choroiditis disseminated throughout the entire fundus would indicate

¹Read before the Section of Ophthalmology, College of Physicians, Philadelphia, March 2, 1899.

gradual and general atrophy of the posterior layers of the retina and slow loss of function. The difference between the various forms of choroiditis and the modified forms of congenital and probably inherited retinitis pigmentosa, described by Fuchs is, that, to the atrophic process commencing early in life in the choroid, is added slow and generally progressive optic nerve and retinal atrophy, giving rise to the early night blindness and the later complete loss of function.

The characteristic features of the three forms of modified retinitis pigmentosa, condensed from the papers of Cutler and Fuchs, are as follows:

Retinitis punctata albescens. White points sharply limited and without pigment, most numerous around the papilla and macula, disseminated throughout the retina *in connection with* existence of the disease in childhood, blood-relationship of the parents, diminution of direct vision and marked concentric narrowing of the fields and night blindness—the last, since childhood.

Atrophia gyrata choroideæ et retinae. Atrophy of the papilla, retinal vessels almost invisible, papilla surrounded by a zone of normally colored fundus, this by an atrophic area containing islands of normal appearance, joined to each other by long narrow bridges—the remains of healthy fundus left between the atrophic areas, pigment spots toward the periphery, night blindness, consanguinity of parents. The choroidal atrophy is the most conspicuous feature of the ophthalmoscopic picture. "This occurs first discreetly in the form of round, sharply margined bright dots which increase in size until they become confluent. They now melt completely into one another or remain divided by small strips of normal fundus. Over the atrophic area a few choroidal vessels and pigment specks are to be seen. The atrophic spots lie in a zone having the papilla for the center and extending from the equator to this point. The longer the disease lasts the nearer this zone approaches the papilla." Posterior star-shaped cortical opacity of the lens was found in all of Fuchs' cases.

Retinitis pigmentosa without pigment The symptoms and history of the cases reported, of which there is a sufficiently large number, do not differ from those of the typical pigmented forms. Its characteristic features are consanguinity of parents, early and marked night blindness and progressive

atrophy of the optic nerve and retina. The bibliography, from the earliest ophthalmoscopic times, is given by Cutler. Since the publication of his article, papers, descriptive of the disease, have been written by Simonds (*British Medical Journal*, January 22, 1898); Gould (*Annals of Ophthalmology*, October, 1897); Atwood ("Royal London Ophthalmic Hospital Report," 1895), and others.

CASE.—Anna H., aged 10 years; a pronounced blond, but healthy-looking child, of healthy parents who are not blood-related. H. 5 D. The media are clear, the lens showing no signs of cataract. In the right eye, between the disk and papilla is an oblong pigment patch, two-thirds the size of the disk, surrounded by a white ring of atrophied choroid and nearer the periphery are several smaller round spots of partly atrophied choroid. The optic nerve is distinctly paler than normal, the veins of good size but the arteries contracted. The field is slightly limited toward the temporal side. The left eye shows the same general appearance, although the pigment patches are fewer and less noticeable. V. $\frac{20}{50}$. The child has not yet complained of night blindness, partly because of her youth and partly because the disease is in its incipency.

I classify this case among the anomalies of retinitis pigmentosa mainly because of the atrophy of the optic nerves commencing in childhood and existing in connection with unusual patches of atrophied choroid and retina found in both eyes. This diagnosis may be open to question from the feeble characteristics of retinitis pigmentosa, yet I believe at a later stage of its development the diagnosis will be confirmed.

AN OCULIST'S EXPERIENCE IN THE ARMY.¹

BY JOHN KYLE, M.D., MARION, IND.,
MAJOR AND SURGEON 160TH INDIANA VOLUNTEER INFANTRY.

THE emergency which demanded the calling to arms of some 160,000 volunteer soldiers, and the rapidity with which they were mobilized, astonished the world. Considering the rapidity with which regiments were recruited, the physical, intellectual and moral standard of the troops in general was such as to thrill the hearts of those who had the opportunity of being closely in touch with our army. It will be a growing source of pride, as in after-years, history relates the true, unbounded and unselfish patriotism of the American people.

To begin with, I want to disclaim that the position of an oculist, suddenly transported to the full charge of a regiment, brigade or division, is an enviable one. To me the transition was very sudden; to step down from an easy-going business to all the laborious duties of an army surgeon in the field, with books, records and reports to learn and supervise was quite enough to turn beautiful black hair to silver whiteness. However, medicine and surgery when once learned are never quite forgotten, while records are easily learned.

The rapidity of mustering the respective regiments into the United States service and the demand that all be taken, gave but little time for a thorough and complete examination of the eyes. But few surgeons were at all familiar with this organ; the consequence was that many men entered the service with greater or less eye affection. Among the more prominent defects which I have observed were convergent squint, double and single coloboma of the iris, mydriasis, retinitis pigmentosa, myopia, hyperopia and dacryocystitis. The question will naturally arise, why men with defective vision could slip by the examiner without being detected? The majority of young men who presented themselves were quite smooth and quick to impart information to any of their unfortunate

¹Prepared for the Fourth Annual Meeting of the Western Ophthalmological and Oto-Laryngological Association, held at New Orleans, La., February 10-11, 1899.

companions. I especially remember the cadets from the University of Vincennes, all madly enthusiastic, when one of their members with defective eyesight was stood up for examination, one or more constituted themselves a committee to whisper information through the cracks of the wall. Every scheme was resorted to to escape the vigilance of the examining surgeon.

In making the examination of a recruit the color of the eyes is determined by comparison with the standard eye-colors issued by the Surgeon-General. Note is made if the color is not the same in both eyes, and if there are any peculiarities of pigmentation, that is, the presence of black or red spots in the general color, and if there is any deviation in the normal circular form of the pupils.

The Medical Department of the Army has classified the different diseases, and in consequence the surgeon is in many cases restricted in his nomenclature. This does not, however, apply so much to the diseases of the eye. I will enumerate the diseases as recognized:

Diseases of the lids, acute and chronic conjunctivitis, corneitis, diseases of the choroid, iritis, retinitis, snow blindness, asthenopia, cataract, glaucoma, amaurosis and night blindness.

It will thus be seen that the many and varied forms of eye disease are not expected. In consequence the regiments are poorly equipped with instruments necessary for delicate operations upon the eye. However, all general hospitals are amply provided with such instruments. I do not appreciate the reason why the surgical outfits supplied to the regiments for field service are not furnished with a Politzer bag. This is one of all the instruments every surgeon with the army in the field has a demand for daily. The diseases which I have most frequently observed, are the following enumerated in order of frequency:

Acute and chronic conjunctivitis, keratitis, pterygium, hyperesthesia of retina, granular conjunctivitis, optic neuritis and acute glaucoma.

It has been a source of interest to me that so few cases of iritis, keratitis and granular conjunctivitis have come under observation during the past year. When we take into consideration the climatic changes, the great amount of dust troops on the march are exposed to, the scarcity of cases of conjunctivi-

tis is wonderful. In the field it is impossible to make a microscopical examination of the cases of conjunctivitis. Unfortunately microscopes did not reach us until very late at Chickamauga Park, and I thus had not time to devote to the work. Considering the fact that gonorrhœa is such a prevalent disease in the army I have so far seen but five cases of gonorrhœal conjunctivitis. In Matanzas, Cuba, a great many cases of acute conjunctivitis presented themselves for treatment.

Dr. Gifford, of Omaha, has, in a number of interesting articles, called especial attention to the pneumococcus of Fraenkel as a cause of a majority of cases of conjunctivitis in that city. Since reaching Cuba I have carefully examined, microscopically, every case of conjunctivitis in my regiment for this organism to, if possible, prove that the pneumococcus is the most frequent cause of conjunctivitis in Matanzas, Cuba. In a number of cases no specific organism could be found, only broken down epithelial cells and mucous corpuscles; while in 70 per cent of the cases the pneumococcus was found, but not in great numbers. I can say that the observations of Dr. Gifford will apply to Matanzas, and that the pneumococcus of Fraenkel is the most frequent cause of conjunctivitis.

The number of cases of conjunctivitis is greatly increased in my regiment by the glaring sunlight and dust. The days are often intensely hot and the nights cool, in consequence, acute affections of all the mucous membranes are very common.

I mentioned the scarcity of cases of keratitis which came under observation. Relative to this I desire to note that five cases of keratitis presented themselves, in my regiment, following measles. Mumps and measles always follow a new army, especially so with regiments recruited from small towns and country districts. Men from the cities, when children, as a rule, pass through such diseases. While in private practice children, as a rule, are the ones that present eye-complications following measles. The soldiers could not be adequately protected from the light and would fail to take the necessary precautions which are enforced in private practice. There was nothing peculiar about the cases, except the slowness of their recovery, due to want of nutrition of the cornea. Such cases are irrigated with hot boracic solution, and antiseptic treatment of the ulcer.

The experience gained by long association with the army is invaluable to me, and my work kept me sufficiently in touch with our specialty. Fortunate, I think, is any surgeon who has, regardless of even great financial sacrifices, served with the American army during the Spanish-American war.

PERSISTENT PANNUS CURED AS A RESULT OF ACUTE DACRYOCYSTITIS.

BY J. ELLIS JENNINGS, M.D., ST. LOUIS, MO.,

CHIEF SURGEON, EYE DEPARTMENT OF THE ST. LOUIS EYE, EAR, NOSE AND THROAT
HOSPITAL—OPHTHALMIC AND AURAL SURGEON TO THE ST. LOUIS MULLANPHY HOSPITAL, ETC.

VERY many cases of trachoma associated with pannus seem, like Tennyson's brook, to go on forever, getting better, then worse, until the surgeon almost gives it up in despair. Through the kindness of Dr. Pollak the following case is presented, owing to the unusual complication which assisted materially in its cure.

Miss J. W., aged 12 years, came to the eye clinic of the Mullanphy Hospital, August 18, 1898. She is a delicate, anæmic girl who, according to the statement of her father, has had sore eyes from infancy. When about 7 years old she developed granular lids, and since that time (5 years) has received almost constant treatment, drifting from clinic to clinic.

When she came to the Mullanphy Hospital there was considerable lachrymation, photophobia and vision was reduced in the right eye to $\frac{20}{200}$ and in the left to $\frac{20}{100}$. On everting the lower lids the palpebral conjunctiva was seen to be thickened and roughened by partially absorbed trachoma granules. The conjunctiva was discolored a dark brown, the result of long-continued applications of nitrate of silver (argyrosis). The upper half of the cornea was overlaid with newly-formed vessels and tissue presenting a fleshy mass which hid the iris from view (pannus crassus). Atropine was instilled, and the inner surface of the lids touched with sulphate of copper three times a week. She was given cod-liver oil, and the following drops to use at home:

R.	Acid. tannic.,	-	-	-	-	-	gr. vijss.
	Acid. borac.,	-	-	-	-	-	gr. xv.
	Glycerin.,	-	-	-	-	-	ʒij.
	Aquæ,	-	-	-	-	-	ʒij.

Having noticed a discharge from the nose, she was referred to Dr. Leo Chaplan, who found incipient atrophic rhinitis, and gave appropriate treatment. After several months of the above treatment, finding little or no benefit, my colleague, Dr. S. Pollak, suggested the use of jequirity. Eight beans were bruised and placed in one ounce of cold water, and allowed to stand 24 hours, then filtered. Two drops of this infusion was instilled into each eye three times a day for three days. This caused considerable reaction; pain, œdema of the lids and an abundant discharge of pus. The after-treatment consisted in the use of atropine and in frequent bathing with hot water.

After ten days the inflammation subsided, leaving the left cornea almost free from pannus, while the right cornea showed marked improvement. The improvement did not last, for after catching cold she returned almost as bad as ever. One morning our patient appeared with an acute dacryocystitis of the right side. There was severe pain, tense swelling of the sac and marked œdema and redness of the lids and surrounding parts. An incision was made into the sac, giving vent to a thick, creamy pus. After the inflammation had subsided the nasal duct was probed and syringed with an antiseptic solution. Our little patient did not take kindly to this treatment and avoided us for about two weeks, when the acute symptoms had recurred and it was necessary to evacuate the pus and continue the treatment as before.

This treatment, however, was carried out in a perfunctory manner, as it was observed that from the onset of the dacryocystitis a remarkable change for the better had taken place in the condition of the eye itself. The lachrymation and photophobia disappeared and the dense pannus began to clear up slowly but surely until, in a few weeks, had practically disappeared.

NOTE.—April 20, 1899: The patient has been seen at least twice a week since the above report was made. The cornea remains clear and the eyes look remarkably well. The only treatment consists in probing the nasal duct and syringing with an antiseptic solution.

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ORIGINAL ARTICLES.

SOME OF THE FAILURES IMMEDIATE AND
REMOTE MET WITH AFTER CATARACT
EXTRACTION.

BY J. MORRISON RAY, M.D., LOUISVILLE, KY.

THOSE of us who can not obtain the advantages of a special hospital are called upon to perform operations for cataract in the surgical wards of a general hospital, in medical college clinics, and in all kind of private dwellings; often in country towns where, after the operation, we occasionally never see the patient again, or only for the first few dressings; under such conditions it is impossible to follow out the cases, note the course of healing and the visual result.

Attention to detail largely governs the measure of success which attends all surgical operations, and this is conspicuously true of cataract extractions. With a thorough cleansing of surrounding parts, as well as the field of operation, sterile instruments and sufficient manual dexterity, uncomplicated cataract gives us little concern as to the outcome. When failures do occur a careful study of the causes leading thereto may prevent a repetition at some future time of the same error.

My personal experience comprises 141 operations, many of them performed under the most adverse circumstances, and yet the complete failures in uncomplicated cases have been few.

My early hospital training led me to adopt the combined

method of extraction, yet I saw the simple operation lead to brilliant results in the clinics of DeWecker, Galezowski and Panas. Of the 141 cases 36 were simple extractions. In 77 cases one eye only was operated upon; in 32, both eyes, at different sittings; 44 cases were among the colored race, and 97 were whites. All of them were done under local anæsthesia from cocaine.

In operating by iridectomy, the incision was made as near the sclero-corneal line as possible, including about one-third of its circumference, with a small conjunctival flap when it could well be obtained, usually central-crossed lacerations of the capsule, and great care in the cleansing of the incision of all particles of shreds and débris. In the simple operation the incision was aimed to be slightly larger and farther forward in the cornea, especially at its summit.

The conditions have been such that accurate final visual results have not been obtained in at least one-fourth of the cases, in many others only when discharged from the rooms. The failures, however, have been vividly impressed upon me and, therefore, were watched in detail.

These consist in 3 failures from primary corneal suppuration or wound infection; 1 from hæmorrhage from the iris; 2 from suppurative irido-choroiditis, starting in the scar of an iris prolapse sometime after an apparent success; 2 directly from the results of secondary operations.

The first case lost was from primary corneal suppuration early in the series. Mrs. Taft, aged 58 years, was operated upon early in May, 1887, by the modified Graefe method, with but little traumatism, and no complications during the operation. The hygienic conditions were not good, but care was taken to thoroughly cleanse the surroundings and flood the eye with boric acid solution. The ordinary flannel bandage over a gauze and cotton pad were the dressings. The next day she complained of some discomfort, but the dressings were not removed until the second morning. On inspection the corneal lip of the wound was seen to be hazy, and no effort in the formation of the anterior chamber was apparent. Hot compresses were applied, and 10 grains of calomel were given. The same afternoon showed extension of the corneal haze and beginning necrosis. In two days more the iris was involved, and panophthalmitis supervened.

Why this eye should have been lost and others in which far greater defects in my operative technique occurred, seemed beyond explanation, since a successful result was obtained in the fellow eye six months later, the only added precaution being a preliminary iridectomy.

The second case lost primarily occurred in Mrs. Chapman, aged 62 years, and was badly complicated. The right eye was atrophied from trachomatous corneal ulceration, and the left cornea was slightly hazy and vascular. Extensive entropion and trichiasis existed in both eyes. In May, 1891, I did a plastic operation on the upper lid of each, following the method of Green. After this, prolonged treatment with copper brought about subsidence of the irritation, and an extraction by iridectomy upward was carried out. Notwithstanding all precautions in the way of asepsis were followed, the wound refused to heal, the cornea became hazy and panophthalmitis destroyed the results of my long and tedious attempt to give this unfortunate woman one useful eye.

My third patient, Mr. O., with senile cataract, mature in the right eye but with useful sight in the left, was seen in 1891. He was suffering from chronic lachrymal abscess in both eyes, the canaliculi had been slit years before and on pressure, pus in quantities was extruded. For four months I treated the lachrymal disease by probing with Theobald's probes up to No. 12, and washing with boric acid and astringents. The pus was apparently overcome, and at times only mucoid material could be forced out. As a preliminary to the operation, washing out the lachrymal canal with bichloride solution, $\frac{1}{3000}$, was made. Twenty-four hours afterward the dressings were removed and all looked well, on the second dressing pus was found regurgitating from the sac, but beyond considerable irritation, no infection was apparent; on the third day, however, the wound began to show some infiltration. All dressings were now removed and the eye irrigated every two hours with bichloride solution, but the infection gradually progressed, the iris became involved and suppurative irido choroiditis closed the scene.

All operators are aware of the danger of infection in lachrymal abscess cases, and while in the hands of some it has not been a serious complication, to my mind it is a grave one. Von Rothmund, in 1420 extractions, encountered it 8 times—

none of these were lost, yet, beyond opening the canaliculi and probing with Weber's probes, no special precautions were taken. In 8 consecutive cases, Collins report good results from daily syringing the canal with boric acid solution. Streatfeild says the danger is almost as great when there *has been* lachrymal obstruction as when the pus is obviously present, because a discharge will reappear after the operation and pus be found before the wound in the cornea has healed. Therefore he advises that the sac be opened and destroyed by the galvano-cautery as a preliminary to all operations involving the cornea. Less radical measures have proven successful in the hands of others. Berry and Schweigger have had successful results from opening up the sac and packing it with iodoform at each dressing, filling the inner canthus with powder. Kirschbaum advises that a strip of iodoform gauze be inserted in the sac, filling the inner canthus so as to draw all deleterious secretions in the sac away from the conjunctiva. I succeeded in one case by washing out the canal with formol solution, $\frac{1}{2000}$, and leaving off all dressings on the second day, thus lessening the danger of pus accumulations in the sac.

Within the last few years a number of observers have reported loss of eyes from hæmorrhage immediately after the extraction. The source of the blood varies in different cases. For instance, Hotz, Spalding, Wadsworth and others report cases where the blood unquestionably came from the choroid; on the other hand, Fryer and Baldwin's cases were apparently from the cut iris. Oliver has reported a case where excessive hæmorrhage from the iris occurred two weeks after the operation, and recurred; good vision eventually resulted.

My experience included one case. Miss S., probably 65 years old, was brought to me in 1893, blind in the right eye from mature uncomplicated cataract, the left eye with beginning lens changes. She was spare built with a flabby skin and a peculiar sallow complexion, and a history of rheumatic attacks; no organic kidney disease. On physical examination of the eye I could find no cause for refusing an operation, which was done the same afternoon, as her family physician was anxious to return home, and the patient was too timid to have the operation done without his presence. The surrounding parts were well cleansed with bichloride solution and the conjunctiva irrigated with the same a few hours before the

time set for the operation. The incision was nearly in the sclero-corneal margin with a small conjunctival flap, an iridectomy and laceration of the capsule were quickly followed by the exit of the lens; considerable blood filled the anterior chamber obstructing a view of any cortical remains. Much difficulty was encountered in cleansing the cut of blood-clots, and irrigation along the incision became necessary. The eye was now bandaged. The patient had been operated upon in bed, and no exertion on her part was therefore necessary. The next day the dressings were removed, these were slightly discolored with blood corresponding with the canthal slit. On examination of the eye, the anterior chamber was found still filled with blood, and the incision occupied by a blood-clot; an effort to remove this failed, because of the resistance of the patient. The eye was washed out with a bichloride solution, $\frac{1}{3000}$, and again bandaged as firmly as comfortable. The blood absorbed slowly, and the lips of the wound pouted and contracted tardily, but no infection occurred. At the end of ten days there was still some blood in the anterior chamber, and a band of organized lymph occupied the wound, the pupil was not influenced by atropia, and a mass of blood, lymph and capsule filled the coloboma. The wound now began to contract, and in four weeks she returned home the eye still irritable. Three and a half months later she came back to me, the eye was free from redness and partial flattening at the seat of the incision had taken place, a brownish membrane filled the pupillary area, perception of light was present. I refused to make a secondary operation because of the danger of farther phthisis. The left eye was subjected to operation without iridectomy, no complications occurred and vision of $\frac{6}{xv}$ was obtained.

Within the last decade the advocacy of simple extraction by leading operators connected with large ophthalmic hospitals has brought it into general use even by the beginners in eye surgery who possess none of the advantages in the after-care of their more fortunate teacher. From an æsthetic standpoint, there is no question of its superiority over the operation with iridectomy, but the danger of prolapse outweighs its other good points. Looked at from any standpoint, prolapse of the iris is a serious menace to the eye. If small and left to contract, the recovery is slow, and useful visual acute-

ness interfered with by the very great amount of astigmatism, which is slow in lessening. It is not always possible to prevent the iris from cicatrizing in the wound in any form of operation; the leakage of aqueous may carry a portion of the coloboma into the incision at any time before the complete closure of the corneal wound; but in simple extraction when prolapse occurs, the lymph binds the iris at the angles and prevents it from being disengaged even after the protruding portion is excised. Microscopic examinations by Becker of 38 cases of cataract extraction, eyes removed after death, showed in only one-third of the cases absence of the iris tissue in the scar.

Nothing can be more deplorable to the ophthalmic surgeon than to see an eye after it has obtained sight, lost by a violent purulent infection starting in an incarcerated iris. Schoeler says that cases of prolapse should be watched, since infection through incarceration and loss of the eye may occur after years.

Knapp states that the iris prolapse in cataract operations very rarely occasions the loss of the eye. In a synopsis of 1000 extractions with iridectomy, he speaks of two cases lost long after the operation through suppuration starting in a bit of incarcerated iris in the angle of the scar. Since the simple operation has become more popular, such accidents must necessarily become more frequent. My experience with this operation has been exceedingly disastrous. In 36 simple extractions, two eyes were destroyed long afterwards by infection starting in a mass of engaged iris.

CASE 1.—George S. Moore, aged 59 years, was operated upon by simple extraction in December, 1891. The patient was timid, and just as the lens was passing through the incision a sudden grip of the lids forced it out and with it a small quantity of vitreous. The iris corresponding with the incision seemed to sink back against the ciliary body and disappear. I cleansed the wound as best I could without further loss of vitreous, and bandaged the eye. The next day when I dressed the eye the iris had come forward and was caught in the inner corner of the incision, but for fear of more vitreous being lost, I did not excise it. The eye recovered slowly and the prolapse flattened, but considerable astigmatism existed for some time. In June, 1892, six months after, I ordered permanent

glasses. Javal showed six degrees of astigmatism against the rule, but with +12 D. spherical combined with +3 D. cylinder axis 15° , V. = $\frac{6}{ix}$ and a +4 D. added to this gave Jaeger No. 1. In November, 1893, I operated on his right eye, making an iridectomy. Eleven weeks afterwards my record reads: R. E. with +12 D. spherical V. = $\frac{6}{v}$, L. E. +12 D. spherical combined with +2.25 D. cylinder axis 15° , V. = $\frac{6}{vi}$.

In July, 1896, during a protracted season of high temperature, I was called to see him. He had been in great pain for 24 hours with the left eye. I found a purulent iritis well advanced, which seemed to have as its focus the old point of incarceration. The vitreous rapidly became infected, and panophthalmitis supervened. Before this latter condition was well established, enucleation was advised, but examination of the urine showed such large quantities of albumen and casts that it was thought best not to incur the danger of an anæsthetic, so the eye was allowed to atrophy. The patient is still enjoying useful sight with one eye. No further examination of his urine has been made, but I see him on the streets apparently in good health.

CASE 2.—A. T. Brentlinger, aged 45 years; this case was of a similar nature. In December, 1893, I operated on his left eye at the clinic of the University of Louisville, with iridectomy and a peripheral corneal incision. The patient was a model one in every way, and in one week the eye was practically well. Four months later he came to my office and requested that I operate on the other eye, as it was now useless to him, and his occupation as a carpenter had been seriously interfered with, he having to depend on one eye and that with no accommodation. He further complained of the excessive glare in the eye operated upon. I agreed to operate by simple extraction if he could be placed in an infirmary. Accordingly I operated a few days later. No accident of any kind occurred during the operation, the iris came out with the lens and was easily replaced, a central round pupil being obtained. At my first dressing I found a small prolapse into the wound, but it did not protrude, and was not excised. This gradually enlarged until quite a good sized bead presented. The eye was slow in healing, the protruding iris gradually contracted, and V. = $\frac{6}{xviii}$ was obtained.

In October, 1894, I did a secondary operation on the cap-

sule in each eye. No reaction followed. The vision was improved, but my record of that date has been lost.

In August 1897, I was asked by Dr. Lederman, Chief of the Eye Clinic of the University of Louisville, to see this man at his home. The history was that he had been seeing well with both eyes until three days before, when working in the hot sun he perspired freely, and the perspiration got into the eye and it became very irritable. The night following it pained him very much; the next morning he could not see with it. He applied at the clinic and was given a solution of atropia and an eye wash. The following day Dr. Lederman saw him, and recognized a purulent iritis starting in the iris adherent to the old corneal wound. When I saw him all the uveal tract seemed to be the seat of purulent infiltration, and enucleation was advised to shorten the pain. Examination of the urine showed an excessive amount of albumen present, and the operation was deferred. For several days he was in much pain, and a condition of stupor and mild insanity supervened. He eventually recovered and returned to his work. A recent examination showed the right eye phthisical. The left is free of all irritation, clear central slit in capsule and well-formed coloboma. $V = \frac{6}{x_{11}}$ with $+11$ D. spherical combined with $+1.75$ D. cylinder axis 170° . Urine examination showed absence of any evidence of kidney disease.

Arlt and Leber attribute such results as these to septic inoculation in a cystic scar.

Wagenman was the first to thoroughly examine these cases. He reports 13 cases in which suppurative hyalitis occurred at periods varying from a few months to some years after the healing of an operative wound or a prolapsed iris. Extraction of cataract and iridectomies for glaucoma were the most frequent causes. He propounds three hypotheses: (1) The micro-organisms may have entered the wound before it was healed and remained inert. (2) The organisms may have invaded the cicatrix from the circulation and found in these tissues the point of least resistance. (3) The cicatrix may have become newly infected. The latter theory he considered the most probable.

It has been stated that since cystoid cicatrices occur when the lines of incision invade the sclera and never when the cornea, that if the incision is placed properly no such sequela

can occur. In opposition to this may be mentioned the case reported by Berry, wherein the eye was lost nine months after a successful cataract operation in which the wound was corneal and no prolapse, but the iris apparently adhered to the inner lip of the wound. All of us have seen similar destructions of the eye starting in old prolapses from corneal ulceration.

Berry further reports a case from the Clinic of Argyll-Robertson, and states that both cases were exposed to great heat before the outbreak of the septic infection.

The two cases that I have just reported occurred in extreme summer weather, and one subject explained his trouble by the fact that he worked in the very hot sun and the eye became inflamed from perspiration. It appears that the irritation from the extreme heat produced a conjunctival irritation of such a character as to act as a fertile soil for organisms which, through some slight traumatism, invaded the scar and spreading from thence to the iris and vitreous produced general septic infection of the contents of the globe.

Scarcely of less gravity than extraction of the opaque lens itself, is the operation for the secondary capsular membrane. Recognizing this fact, removal of the lens in its capsule has its advocates, preferring to risk the loss of vitreous and its possible after-results rather than to incur the dangers incident to secondary operations. Removal of the anterior capsule by the forceps method of DeWecker is certainly an advance, provided it can be accomplished in all cases.

Peripheral capsulotomy as advocated by Knapp must necessarily be followed by the largest percentage of secondary operations. For instance, in his second hundred of simple extractions, 74 per cent required after interference. Landolt, from a review of the experience of many operators, comes to the conclusion that secondary capsule operations are more dangerous than the extraction itself.

The amount of visual acuteness contraindicating a secondary operation, is a question of importance. Whenever the visual acuteness is $\frac{6}{XXIV}$, or better, I have refrained from interference. My experience with secondary operations is confined to 53 cases. Of these, two were lost completely, and in a third the vision was far worse as a result of the interference.

The first was that of Ruth R., colored, aged 71 years, extraction in March, 1896, at the University Clinic. As the

corneal incision was finished, she violently squeezed the eye and the lens, together with the iris and a quantity of vitreous, was forced out, the lens rising into the air and falling on her cheek. I quickly removed the speculum and succeeded in excising the protruding iris with a large bead of vitreous, and partially approximating the wound. Notwithstanding this accident the eye promptly healed. The violent muscular effort had ruptured the capsule in a horizontal direction just above its center. The lower portion contained a mass of opaque lens material remaining in the capsule. Three months later a test of vision showed $\frac{6}{LX}$. I attempted, with Knapp's knife-needle, to make a crossed incision in the opaque area; the horizontal incision was without incident, but when I attempted the vertical slit the membrane appeared to yield slowly, and as I withdrew the knife, a retinal detachment floated into the pupillary space. The ultimate visual result was perception of light only. Recently I operated on the fellow eye without incident.

The second one lost was even more unfortunate. Mr. E. B. Russell, aged 79 years, extraction with iridectomy, March, 1896, right eye. Twelve days later vision was with $+10$ D. spherical, $\frac{6}{XX}$. He returned to his home and I saw nothing more of him until December, when he came to me, complaining of failure of vision in the operated eye. With his glasses $V. = \frac{3}{LX}$. Oblique illumination showed thickened membrane in the pupillary space. He was sent to the infirmary, his eye prepared for operation by thorough cleansing of the surroundings and irrigation of the conjunctival sac with boric acid. A T-shaped opening with Knapp's knife-needle, under artificial illumination was made. The eye was irritable for three days, but the pupil responded to a mydriatic, a cloudiness began in the vitreous, and in twenty-four hours a suppurative hyalitis destroyed the eye. In April, 1898, I operated on his other eye with useful vision resulting.

In one other case, after a simple extraction and with $V. = \frac{6}{LX}$, a secondary operation was followed by acute glaucoma which was relieved by eserine and paracentesis, but the vision was never as acute as before the secondary operation. The only explanation for Knapp's great success in secondary operations must be due to the fact that he usually makes this oper-

ation not later than six or eight weeks after the primary extraction.

I have dealt entirely with the dark side of cataract operations, hoping more could be learned from a study of failures than from tabulation of the results in cases following the normal healing process. My observations do not coincide with those of men of greater experience, especially on the influence of prolapse of the iris upon the future well-being of the eye, judging by the following extract from a recent writer of large and varied opportunities:

"Corneal fistulæ are rare, and have never yet been shown to produce purulent intraocular inflammation. It is true that eyes which have maintained a prolapse of the iris after extraction have ultimately gone to ruin from intraocular inflammation, but that does not prove that the prolapse was the cause, for if so, such results would be much oftener met with."

MEDICAL SOCIETIES.

FOURTH ANNUAL MEETING OF THE WESTERN OPHTHALMOLOGICAL AND OTO-LARYN- GOLOGICAL ASSOCIATION,

HELD AT NEW ORLEANS, LA., FEBRUARY 10-11, 1899.

Discussion on paper read by DR. B. E. FRYER, of Kansas City, Mo., entitled "*Profuse Hæmorrhage Subsequent to Extraction of Senile Cataract.*" (See issue February, 1899. page 33).

DR. REYNOLDS suggested the propriety of the hypodermatic injection of the muriate of pilocarpin and the subsequent exhibition of ergotin. He had encountered no such disastrous hæmorrhage as that described in the essay, and doubted if in such a case as described, the hæmorrhage could have been arrested by any possible means in time to save the eye; but in less severe cases he had seen the value of pilocarpin and ergotin.

He could find no language suitable to express either his surprise or condemnation of the practice of using morphine in cases of either primary or secondary hæmorrhage.

DR. DAYTON stated that Dr. Fryer's paper was a very carefully prepared one, and the doctor's question on hæmorrhage following senile extraction should be carefully inquired into as to the causation. As to the condition which one is liable to find in each individual case reported—and by this is meant the condition of the eyeball, is it normal, or as in the case of Dr. Fryer, is it glaucomatous?—would we be expected to find hæmorrhage following extraction in an eye in which the tension is minus or slightly so, where we might possibly expect to find the vitreous fluid; or would we expect to find in an eye with a plus tension hæmorrhage following extraction? He did not remember whether the Doctor spoke of the tension

of the eye at the time of the operation. As he understood him, the tension was plus before he did the iridectomy, a year previous to the extraction. He then asked whether it was plus, normal or minus at the time of the operation, and whether the condition of the patient was due to atheroma of the vessels of the patient; in the latter condition, after sudden removal of the lens we might expect hæmorrhage immediately.

In regard to catharsis and medicaments prior to an operation, it has always been his practice to give a good dose of calomel followed by an ounce of Epsom salts, which produces a catharsis which is free, and a good practice as far as medicaments are concerned prior to an operation. He stated that with a view of collecting statistics, any abnormal condition of a cataractous eye prior to operation should be carefully noted, and by so doing, a careful study of these cases could be made, which he considered of importance to ophthalmologists.

DR. CASEY WOOD stated that had he known he was to take part in the discussion of this paper he would have brought the notes of a case which he had not published. He was very much interested in the question of intraocular hæmorrhage after cataract extraction, and had listened with pleasure to the article. He then referred to an article on this subject by Da Gama Pinto, which he had translated. There is nothing in the whole range of post-operative accidents in cataract operations that is more alarming than bleeding in these cases, and his own particular case had impressed him very much. They are analogous to the occurrence of cerebral hæmorrhage in the ordinary form of apoplexy. The principle cause in both cases is the diseased condition of the blood vessels. He did not believe that any treatment before or after the extraction had any effect in lessening the chance of hæmorrhage. Every one knows that cerebral hæmorrhage often occurs without any particular exciting cause. The patient may be seized when walking along the street, while in bed or when quietly sitting. The same is true of hæmorrhage after operation; it is impossible to foretell it, and we should not, after having taken the usual precautions, be held responsible or hold ourselves accountable for it.

One of the interesting points in the DaGama Pinto report was that he was able to prove from a microscopical examination that the bleeding came from the choroidal vessels. It is quite

likely that where the bleeding is retinal it appears early, but if from a small choroidal vessel, the blood collects slowly and is less likely to push forward the vitreous and escape externally for sometime afterwards. If we had bleeding from a ruptured retinal artery, we should expect that the bleeding would show itself immediately.

DR. WUERDEMANN said that there is some relation between the glaucomatous condition and bleeding after cataract extraction. He had a specimen to exhibit of subchoroidal hæmorrhage happening twelve hours after a clean iridectomy in a case of glaucoma. This was in an old man, who was very quiet afterwards; there was no vomiting and no exciting cause for the bleeding, except the operation.

DR. ALT remarked that while he had never had an occurrence of hæmorrhage after extraction, he had seen a similar occurrence after abscision of a staphyloma, with probably some glaucomatous increase of tension. When the staphyloma was cut off, the vitreous oozed out and its expulsion was followed by a pulsating stream of bright blood coming evidently direct from the central artery. It was very difficult to arrest, but nothing further occurred. This might show that similar hæmorrhage after a cataract extraction need not always come from the anterior part of the choroid.

DR. ELLETT stated that he had never had this accident to occur to him personally, but, while House Surgeon in Wills' Eye Hospital, he assisted Dr. Risely in the case to which Dr. Fryer referred, and remembered it distinctly. The patient was about 60 years old, with swarthy complexion and a very shallow anterior chamber. He did not recall at what stage of the operation the hæmorrhage occurred, but thought it was immediately after the corneal section was made that the hæmorrhage suddenly appeared and continued for some time in spite of the measures resorted to for its control. The eye was destroyed and enucleation advised, but declined.

In this connection, he described a case on which he had operated recently, in which there was no hæmorrhage, but why it did not occur, he was at a loss to understand. The patient was 60 years of age, with very marked atheroma of the arteries. At the completion of the corneal incision, the patient squeezed very vigorously with his eyelids, and before the speculum could be removed he had gotten rid of the lens and

three-fourths of the vitreous. It was remarkable that no hæmorrhage occurred. The patient finally recovered with useful vision.

DR. FRYER, in closing the discussion, said that he believed Dr. Reynolds had misunderstood him. He did not urge any remedy and did not believe that there was any drug which would prevent with any certainty this accident. If an opiate be used, as suggested by some, its effects should be tested by a preliminary experiment on the patient before submitting him to the operation. Every practitioner knows that opium produces different effects in different individuals, and the effect in each case should be known before operating. If it is used at the time of operating, the narcosis should be kept up until healing of the corneal wound had taken place.

In regard to what Dr. Reynolds stated of the good effects of ergotin, he hardly thought that the Doctor had studied the hydraulic factors which he mentioned in his paper. Everyone familiar with the effects of ergotin knows that where contraction takes place in the vessels, the arterioles especially, there will be a rise of arterial pressure throughout the system, which is the very thing not wanted in these cases. If we produce artificial tension, we are not only likely to have an intraocular hæmorrhage, but may have hæmorrhage in the brain. No one would want to give ergotin or strychnia in such cases for these reasons.

In regard to Dr. Dayton's question as to the tension in his case, it was slightly above normal.

Discussion on paper read by DR. ADOLF ALT, of St. Louis, Mo., entitled "*The Pathology of Cataract, Especially in Its Earliest Stages.*" (See issue February, 1899, page 39).

DR. DAYTON suggested that the subject of Dr. Alt's paper be used by the Program Committee for discussion at the next meeting, as it was such a valuable paper. It would be an excellent subject for a symposium.

DR. ALT, in conclusion, stated he had nothing more to say than that he appreciated very much the remarks made.

Discussion on paper read by DR. RANDOLPH BRUNSON, of Hot Springs, Ark., entitled "*Uric Acid as a Factor in the Causation of Choroiditis.*" (See issue March, 1899, p. 81).

DR. DRIVER said that he had observed a great many cases of choroiditis in patients in whom he could trace no signs of syphilis, and he attributed these cases or some of them to rheumatism or gout.

Discussion on paper read by DR. H. H. BROWN, of Chicago, Ill., entitled "*The Etiology and Importance of Iritis.*" (See issue April, 1899, page 104).

DR. BRUNSON stated that during the past five years he had had exceptional opportunities for observing this class of cases. About four years ago he began to make an examination as to the relative proportion of cases of iritis in syphilis and in rheumatism from his own cases and those of his colleagues of Hot Springs. In 2,350 cases which he had examined, he found that nearly 3 per cent. of the cases of syphilis had had iritis. He did not see the actual stage of the iritis in all the cases, but from the histories and examinations he had found that iritis had occurred at some time in the past, during the secondary stage probably; also that the patients had not, as a rule, had the benefit of active antisyphilitic treatment from the beginning of the disease.

Rheumatic iritis was found to be about $1\frac{1}{2}$ per cent., this being demonstrated by the fact that the patients made a recovery under antirheumatic treatment.

DR. YOUNG stated that he was somewhat disappointed in Dr. Brown's classification. He expected to hear more about gonorrhœal iritis. He could not see why individuals should confess to gonorrhœa and not to syphilis, and he respected the word of the patient in this regard. Some cases that have been attributed to gonorrhœal infection had a peculiarity which he did not understand. He had made no headway without the exhibition of mercury. In one case cited, he had poor results until he had used inunctions; and in another inunction gave temporary relief; but in the midst of this a relapse occurred, causing such severe pain that the man was almost insane. He then gave the patient a subconjunctival injection of salt solu-

tion. The pain soon ceased and the patient made an uninterrupted recovery under continuation of the injection.

The Doctor then called attention to infantile iritis, which is very destructive of vision and produces very few external symptoms. He described a case in which the vision had been entirely lost through a membranous formation in the pupil.

In answer to Dr. Reynolds' question, he stated that his case was iritis of early childhood rather than of infancy—the patient being 4 years old, and that there was no trace of syphilis in either parent.

DR. ALT said that it was difficult to prove an iritis to be due to gonorrhœa unless one had an acute case to deal with, in which the gonorrhœa was promptly followed by rheumatism, especially in the knees, and this in turn by iritis. Some five years ago he had read a statement by a French writer that gonorrhœa was very frequently the cause of iritis, and since then he had made it a point to question his patients regarding gonorrhœa as well as syphilis and rheumatism. He was astonished at the enormous number of patients with iritis who confessed to gonorrhœa.

In regard to subconjunctival injection of salt solution as used by Dr. Young so effectively in his case, he had never used this, but he had used mercury very frequently, and at one time for a long period in a routine manner, and was often surprised at its rapid beneficial action.

DR. REYNOLDS stated that the question of gonorrhœal iritis, like that of gonorrhœal rheumatism, is a difficult matter to settle. The fact that iritis occurs during an attack of gonorrhœal urethritis, or subsequent to it, is no evidence that the iritis is of gonorrhœal origin. Gonorrhœal infection is not rheumatism any more than rheumatism should be regarded as evidence of gonorrhœal infection. Iritis is one of the rarest complications of gonorrhœal ophthalmia. Medical literature is filled with so much superstition as to indicate a very dangerous degree of credulity on the part of the medical profession. Micro-organisms, or their ptomaines, traversing the lymph channels may lead to disseminate localized inflammations, suppurating or non-suppurating. In cases of so-called sympathetic ophthalmia, there can be little doubt that the disease is at first reflected, by nervous connection, from one eye to the other by means of these fibres of the ganglionic system, coming out of

the cavernous plexus into the ciliary ganglion. Reflex irritation in the fellow eye may develop a gradually increasing hyperplasia, or it may lead to circumscribed serous effusion. The exact connection between the primary lesion and the ultimate sequelæ is difficult in our present state of knowledge to establish upon a satisfactory basis.

In reference to infantile iritis, he had often observed in a child less than 8 days old characteristic gummatous iritis, accompanied by syphilitic roseola. Examination of the mother disclosed the presence of the eruption well characterized. Thus it may be seen that the stage of evolution of syphilis in the mother and her new-born infant exactly correspond. This is an observation he has often made at the Louisville City Hospital, and which he has seen at the lying-in establishments of other cities. It may be seen any day at the Lying-in Hospital in Paris.

Many cases of iritis in syphilized persons are due to miasmatic infection, and are wholly independent of the presence of syphilis in their origin and course.

DR. BROWN, in closing the discussion, said that in reviewing the literature of gonorrhœal iritis he found very conflicting opinions. The case reported was the only clearly-defined one he had ever seen, and he was of the opinion that true gonorrhœal iritis is rare.

The subject of sympathetic ophthalmia is as yet a very unsettled one, especially as to the mode of transmission from the injured to the healthy eye, but from the results of a fairly thorough review of this subject, he could see no reason why we could not suspect a trophic influence acting through the nervous system, thus directly or indirectly producing the secondary or sympathetic trouble.

Discussion on paper read by DR. W. E. DRIVER, of Norfolk, Va., entitled "*Best Vision After Cataract Extraction.*" (See issue April, 1899, page 113).

DR. FRYER congratulated Dr. Driver on his paper and said that to quite a number it may seem that many of the means he adopts and of the details he carries out are not always essential, yet the result is so important that anything which may interfere with microbic infection and prevent in-

flammation should be given every effort in order to obtain good results. Like other men, he had his hobbies, and if he rode one more than another it was in the matter of antiseptics. He used for a long time the bichloride solution for the eye, but for the antiseptic preparation on the eyeball he now uses protargol, and where it is impossible for the patient to come to the office, he felt perfectly safe in placing it in the hands of the patient for his own use.

He did not believe in simple extraction. He had seen many cases of some of the best operators living, and there was always a certain proportion of prolapsus of the iris, even in the most careful operator's hands, and for this reason, and with the view of avoiding the prolapsus, he thought preliminary iridectomy, as he had done for years, offered the best chance for safety. With preliminary iridectomy, the prolapsus is avoided.

In regard to the speculum, he had abandoned this and used the lid retractors, and while it may seem to those who have never used them that the assistant would be in the way, this is not the case if the assistant is at all skillful; and the point which Dr. Driver makes in regard to the pressure in taking off the speculum is avoided. It has been impossible so far to construct a speculum which will prevent this.

DR. ALT stated that he did not wish to discuss Dr. Driver's method of carrying out cataract extraction, as every man had his own method and considered it the best. However, he wished to make an objection to one of his statements, because he used to think the same way, and to blame himself for not having succeeded in sterilizing the conjunctival sac completely. It has been proven time and again by careful experimentors that it is impossible to sterilize the conjunctival sac absolutely. As he had made repeated study, especially of the retrotarsal fold with the many openings of the ducts of the lachrymal glands, which, as a rule, contain microbes, he now easily understood why the conjunctival sac can not be fully sterilized. We certainly, however, do by means of germicides interfere with the activity of the microbes. This may relieve us of the necessity of laying blame to ourselves for a microbic infection, which may take place after operation, in spite of everything having been done to thoroughly sterilize the locality and the instruments used, etc. We need not, therefore, always con-

sider such an occurrence as due to our fault, as it is due to Nature's own obstacles placed in our way when striving to sterilize the conjunctival sac

DR. MULLEN stated that in the discussion of the technique of cataract operation, in preparing the iris, etc., one of the very important structures in connection with the eye had been overlooked by Dr. Driver—the drainage apparatus. No mention of this apparatus had been made, nor of thoroughly cleaning it. He said it was absolutely necessary to examine the patient's nasal cavities; they all understood how an acute coryza will affect the eyes, and in preparing the drainage apparatus he cleaned it from above downward, washed it thoroughly and then had the patient use a solution of boracic acid as a nasal wash for several days preceding the extraction. He considered it extremely important to have the patient under control while operating for cataract. The average patient does not know the requirements of the operator and does not realize the importance of looking in one direction and holding his eye in that manner until told to change its position. He followed the method of Dr. Fox, making his patient look out, in, up and down. By this procedure he was enabled to have the eye operated upon under complete control, so that the danger of accident from sudden turning of the eye is greatly minimized.

DR. R. C. HODGES, in regard to rendering the eye thoroughly aseptic and to what extent inflammatory reaction may follow the simplest operation, described a case he had lost. A year previous he had operated for senile cataract. A small band of opaque capsule interfered with perfect vision. After preparing the patient, he used a Knapp knife needle and gently divided the band of the capsule. There was no reaction nor pain, and he instilled a drop of atropin solution, bandaged the eye and sent the patient home. The instruments used were new and properly sterilized. The operation was done at about 11:30 A.M. The following day the patient came to his office a picture of suffering, and on removing the dressing he found the cornea opaque and infiltrated, the entire eye presenting every evidence of purulent inflammation. In less than 48 hours the destruction of the eye was complete. The process was more rapid than in any case he had ever seen.

The case shows that even after every precaution has been

taken to secure asepsis, there is danger, and it further emphasizes the necessity of guarding against infection even in the simplest surgical procedure about the eye.

DR. DRIVER, in closing the discussion, stated that the points brought up by some of the gentlemen were very good. He considered the best germicide so far to be the bichloride of mercury, but admitted that occasionally it will set up irritation, when he then resorted to a solution of borax.

The lid retractors were very practical, though he had very little confidence in assistants. He admitted that it was impossible to make the conjunctival tract absolutely aseptic, but he was enabled to inhibit the action of the ordinary microbe long enough for the corneal wound to heal.

He thought the cutting of the lashes had a bad effect, as this irritated and tended to produce a profuse secretion. Instruction of the patient he considered desirable, but preferred with it the administration of bromide. He emphasized the importance of allowing the cataract to thoroughly ripen before attempting operation.

Discussion on paper read by DR. H. V. WUERDEMANN, of Chicago, Ill., entitled "*Operative Treatment of High Myopia.*" (See issue April, 1899, page 127).

DR. CASEY WOOD referred to an article by himself on the "Operative Treatment of Myopia," published in THE AMERICAN JOURNAL OF OPHTHALMOLOGY, 1889. This was chiefly a translation of Fukala's original contribution to *Graefe's Archiv*, and at the end of the translation is a reference to a case operated on by the removal of the lens by an ophthalmologist of Chicago. The same year he had a satisfactory experience with a young subject who had eighteen dioptries of myopia in each eye. This is the first published case treated after the Fukala plan in America.

His experience with this case led him to think that the most important thing about the operation is the first incision into the capsule; when one operates upon such a subject, especially if the patient be under 40 years of age, it is impossible to tell after the incision has been made through the capsule what is going to happen. The reaction may be very slight—almost *nil*, but when the aqueous humor comes in contact with

the lens substance, it may also be followed by glaucoma or an iritis, and the visual result after these complications is often not as good as if one had, perhaps, been more careful. The proper procedure, in his opinion, is to make a central incision and then wait 48 hours before doing anything further, even if there be no apparent result. A second needling may not be called for until weeks have elapsed, but if it be indicated the opening may be increased in size. Peripheral incisions are dangerous and should not be made until late in the case. As soon as the lens has become thoroughly opaque and is practically absorbed, its removal may be accomplished (if the eye be quiet) by a large corneal incision—an incision that may, with advantage, be combined with irrigation.

Another point of importance to which he called attention referred to a case now under treatment in which there are 14 dioptries of myopia in one eye, while the other eye is almost emmetropic. Here is a difficulty which is extremely hard to overcome, and he did not know what the outcome could be, whether the patient would eventually secure binocular vision or not. So far as the removal of the lens without accident is concerned, that had practically been accomplished, the patient being able to read Jager II, and Snellen $\frac{6}{xviii}$, without glasses.

DR. ALT stated that he had made a number of these operations, and could only agree with what the Doctor said. He had operated on a case almost as long ago as that of Dr. Wood's. In this case there was perfect success in one, but detachment of the retina resulted in the fellow eye. In the first eye, which turned out well, the myopia was about 20 dioptries. The patient is now enthusiastic, for with a weak convex lens, $2\frac{3}{4}$ dioptries, he is enabled to do fine work; before, he was in a deplorable state, he could not use his heavy concave glasses for any length of time, yet only reluctantly consented to operation. The operation on the first eye being so successful, he desired operation on the other. The second eye, however, was not as healthy as the first, and detachment of the retina followed. The patient is, nevertheless, extremely grateful for the restored sight of the one eye. He had since operated on a number of cases and had no further such occurrence.

DR. WUERDEMANN, in closing, stated that in the first operation it was certainly essential to make a minute central incision into the lens capsule. He waits several weeks before

making a second operation. In one of his cases there was very rapid swelling of the lens and signs of impending glaucoma in both eyes and he had to remove the lens at once. Caution is certainly necessary in the matter of operating for myopia. The patients describe themselves as having a new world opened to them.

He stated that the operation was at first received with disfavor by the medical profession abroad, as statements of patients had found their way into newspapers, and several eminent ophthalmologists had been accused of "advertising" on this account.

Discussion on paper read by DR. DUDLEY S. REYNOLDS, of Louisville, Ky., entitled "*The Treatment of Acute and Chronic Glaucoma.*" (See issue May, 1899, page 129).

DR. ALT stated that he was opposed to the idea that an obstruction of the channels in the iris angle is not at least one of the main features of glaucoma, if not the cause. He used to think that this was not the case until he had had much experience with the examination of specimens of glaucomatous eyes, and he now firmly believes that the blocking up of the channels in the iris angle leads to glaucoma. A glaucomatous attack may also take place when the iris angle itself is wide and not obliterated by the agglutination of the iris to the corneo-scleral tissue, and be due to the fact that cells and cell débris are caught in the spaces of the ligamentum pectinatum. He had seen such cases in which there was a wide-open iris angle, but the filtration channels were filled with cells and particles of cells so as to interfere very materially with the filtration of fluids. He was satisfied that such a blocking of the lymph channels, whether these enter into Schlemm's canal or not (a point not yet settled), produces increase of tension. Later on, new connective tissue is formed—at first loose and fine, but which gradually becomes more firm, contracts and attaches the periphery of the iris to the ligamentum pectinatum. Thus the spaces in the ligamentum pectinatum and Schlemm's canal become obliterated, and in their place we find, where the filtration angle should be, a dense tissue consisting of atrophied iris and newly-formed connective tissue firmly attached to the sclero-corneal tissue.

Another point to which Dr. Reynolds referred is the glands which secrete the aqueous humor. Dr. Alt supposed he referred to Collins' so-called glands of the ciliary body. Dr. Alt denied the existence of these glands; he had never found any lumen in these pigmented cell pegs, but he believed that it is pretty well established that the whole inner surface of the ciliary body and of its numerous processes secretes the aqueous humor. He had never seen the choroiditis of which the author assures us that it produces the contraction of the visual field. He thought this contraction was rather due to the pressure against the peripheric nerve-fibers in the optic nerve papilla. Simple evacuation of the aqueous humor can produce no lasting good in glaucoma because it does not really remove the cause, that is the blocking up of the filtration angle. It will remove for a time the surplus fluid. The aqueous humor can not again find egress when the corneal wound is firmly healed.

DR. FRYER said he was very much pleased with Dr. Reynolds' paper, and while most of the theories advanced were not new, they were ingenious; while he disagreed with the Doctor considerably, still the matter of glaucoma, the essential cause of it, was anything but settled. He agreed with Dr. Alt in regard to Fontana's spaces, and while they may not be lymph channels, they are rarely free in glaucomatous conditions.

In regard to mydriasis, which is often found in acute glaucoma and, as stated by Dr. Reynolds, was due to some change in the ciliary muscle, he was of the opinion that were this true the paracentesis of the cornea, while it would not produce complete relief from the condition, would produce temporary miosis, provided that the mydriasis was not the result of the exudation, but due to the intraocular tension. This mydriasis is relieved every time we do paracentesis of the cornea.

Regarding constitutional treatment, he agreed with Dr. Reynolds, and considered it very essential. Occasionally, we can do well with just such a treatment without operation, yet the latter must not be delayed too long. He had yet to see a case of chronic glaucoma improved by any form of operation.

DR. ALT stated that the effects of the miotic are the same as those of the paracentesis. By the contraction of the sphinc-

ter, the periphery of the iris which is either only lying loosely against the ligamentum pectinatum, or is attached to it by a loose and newly-formed weak connective tissue, is pulled away. This is the only way in which he could understand the cases in which real relief is obtained after having used a miotic for a day or two.

DR. REYNOLDS, in closing the discussion, said that he felt thankful to the gentlemen who honored him with their opinion. He felt, however, utterly incapable of comprehending Prof. Alt's explanation of the manner of eliminating waste products, and other foreign matter from the anterior chamber of the eye. It would seem from his explanation that there must be small openings, just like pin-holes, in the inter-pectineal spaces of the ligament that binds the iris to the cornea. If these apertures are veritable sinuses leading from the pectineal grooves into Schlemm's canal, constituting so many sewers for draining waste products from the anterior chamber into the canal, how does Prof. Alt propose to account for the escape of these matters? Schlemm's canal, being occupied exclusively by a plexus of veins, containing no eliminating organs, in fact, lymphatic vessels are not present. Can it be possible the advocates of the so-called angle of filtration, through the pectinate ligament, have traced some outlet from Schlemm's canal through the scleral wall?

It is amazing to hear learned gentlemen talking about the secreting functions of the iris and the ciliary processes. Nature has provided glandular organs in different parts of the body, and to these alone are committed all the functions of secretion. The ciliary processes are so many pigmented elastic connective tissue fibers, projected from the ciliary body into the convolutions of the anterior surface of the capsular ligament of the lens, with which they unite by fusion. These fibers can not perform any functions of secretion or elimination. As to the matter of intraocular absorption and filtration, there is no reason upon which to base the supposition that tissue changes, secretion and absorption take place within the eyeball in any manner different from similar functions in any of the other structures of the animal economy. Neither is the ciliary muscle to be regarded as a part of the uveal tract. This structure is as incapable of taking part in the secreting and excreting functions of the body as any other invol-

untary muscle. The complex processes of tissue change, the removal of waste products through the lymphatic system and the glandular organs fully account for all the changes that take place within the cavity of the eyeball.

If it is true that the aqueous of the eye dissolves the fibrin of the blood, detached endothelium and other morbid products, it is not reasonable to suppose that it is just as capable of carrying away the so-called albuminous fluid found in the anterior chamber of the glaucomatous eye? The statement that evacuation of the aqueous humor contracts the pupil, does not apply to those structural changes in the iris occurring in the course of inflammatory glaucoma. It is a perfectly reliable test of the necessity for iridectomy when the pupil resists the action of miotics. There is not the least reason to believe that the size of the pupil merely has any relation either to the nutrition of the eye or to the tension present in glaucoma.

He believes that the pressure of the infiltrated ciliary muscle in cases of inflammatory glaucoma so disturbs the nutrient nerves passing to the ciliary body as to result in diminished aqueous secretion, which he thinks accounts for the shallow anterior chamber so often found in glaucomatous eyes. That variations in the amount of aqueous humor present in healthy eyes are observed, he did not dispute, neither did he find himself sufficiently acquainted with Nature's plan of organization to know why there should be in the eyes of any individual, sometimes more and sometimes less aqueous humor present.

Discussion on paper read by DR. J. A. MULLEN, of Houston, Texas, entitled "*The Percentage of Color-Blindness to Normal Color Vision as Computed from 308,919 Cases.*" (Paper not received).

DR. YOUNG stated that this was an interesting subject because it seems to hold out and confirm the views which were expressed in a paper published by Drs. Fox and Gould in *THE AMERICAN JOURNAL OF OPHTHALMOLOGY* on "The Theory of Color Perception." As this paper was undoubtedly familiar to many, he would not go into details. The fundamental idea advanced was that the question of color perception was largely a question of thermal registration by the retina. The question

of the distinction between the different colors was in exact proportion to the heat-producing powers of the rays of the spectrum. He noticed that the percentage of color-blindness was higher in Sweden than in other countries, which was in accordance with the ideas of Fox and Gould. This was demonstrated by materially reducing the temperature of the eye, when the color power of the eye would be reduced.

DR REYNOLDS said the statistics referred to in the essay as gathered from different sources and from different countries are about as valuable as statistics usually are. They chiefly serve the purpose of proving the author's theory, whatever that may be. In his judgment the most valuable contribution which has yet been made to the subject is a work entitled "Color Vision," by Captain Abney, of the Royal Engineers.

In determining the color perception, whatever method may be selected, the distance of the test object as well as its character must be taken into account. The test objects taken in the hand afford much less reliable information than those placed beyond the range of accommodation. The physical and mental condition of the person undergoing the test should be noted, as it has been found that gastro-intestinal disturbances, chronic constipation and various neurotic states, and even prolonged loss of sleep disturb the discriminating powers of the eye. It is equally well known that certain forms of astigmatism, uncorrected, interfere with the discrimination of colors. If all the tests were made in a clear atmosphere and by one method, including all the adult population of large communities, the tests would then be valuable, in fact, conclusive. But where the tests which are made of those male adults seeking positions in the army, navy, marine or railway service are alone to be counted, and the loose methods of testing which prevail in some sections—with Holmgren's worsteds, colored balls and test-letters—at all sorts of varying distances and in varying states of the atmosphere, along with the lantern tests made in dark rooms, we shall be at sea in reference to this matter.

He stated he now had in process of publication an article on this subject, which was in the hands of Dr. Ellett, of the *Memphis Lancet*, in which he claims, from what seem to be entirely reliable sources of examination, about 4 per cent. of impaired color perception, whilst Dr. Mullen finds less than

half that amount from what he assumes to be entirely reliable data. He trusted that the importance of this subject would serve to keep it before the profession until more satisfactory conclusions can be reached.

DR. MULLEN, in closing the discussion, stated that his object in writing and presenting this paper was that he had always considered the average percentage of color-blindness, as given in our text-book, too high, and with this idea he had made his investigations, and had found such to be the case.

In reference to Dr. Reynolds' question, he stated that the statistics were obtained from the examination of men making application for admission to the navy, as being the most reliable. The tests were uniform, and upon subjects who were rigidly examined as to their physical condition before entering the navy. The other statistics, while they were practically the same, he did not think were as valuable as those obtained from the Recorder at Washington. The United States he found to be the only government in the world that required an examination for the color sense for admission into the navy, even England and France having no such regulation.

In reference to Dr. Reynolds' remarks about constipation, indigestion, etc., influencing the color sense, he was totally unfamiliar with any such influence, and stated that in every-day life it is a common fact that females are more constipated than males, and that their color sense is more developed than in the latter, which would imply that torpidity of the bowels, etc., does not affect the color sense sufficiently to warrant any notice.

In answer to Dr. Reynolds' question as to what educational requirements were essential in those making application, the first consideration for admission is that the applicant must be able to read and write; as regards further education, he did not know. He had noticed that in the examination of men who were candidates for officers in the navy (naval cadets), the percentage of color-blindness was extremely small, which could probably be attributed to the fact that they had undergone three or four physical examinations before having arrived at that stage in the navy.

Discussion on paper read by DR. CASEY A. WOOD, of Chicago, Ill., entitled "*Glioma of the Pons, with Report of Autopsy and Microscopical Examination.*" (Paper not received).

DR. ALT stated, regarding the question of glioma and sarcoma, that he had always held that glioma was nothing more than small round-cell sarcoma, and he was not now inclined to differ from this opinion, although Greef, by Golgi's method, had shown spider cells. He had not worked with Golgi's or Cajal's methods because he thought it impossible when staining by these methods to differentiate between artefacts and real existing conditions.

PAMPHLETS RECEIVED.

"On a New Method of Autophthalmoscopy." By Pedro de Obarrio, M.D.

"On Congenital Cataract in the Rabbit." By Pedro de Obarrio, M.D.

"A Case of Extensive Chronic Empyema of the Frontal and Ethmoidal Sinuses, with Exophthalmos; Operation; Recovery." By Arnold H. Knapp, M.D.

"A Case of Acute Mastoiditis (Bezold Variety) Without Perforation of the Drum-Membrane; Operation; Recovery." By Arnold H. Knapp, M.D.

"The Value of Repeated and Differently Placed Exposures to the Roentgen Rays in Determining the Location of Foreign Bodies in and About the Eyeball." By Charles A. Oliver, M.D.

BOOK REVIEWS.

AN AMERICAN TEXT-BOOK OF DISEASES OF THE EYE, NOSE AND THROAT. Edited by G. E. DESCHWEINITZ, A.M., M.D. and B. ALEX. RANDALL, A.M., M.D., PH.D. Illustrated with 766 engravings, 59 in colors. Philadelphia. 1899. W. B. Saunders, 925 Walnut St. Price: Cloth, \$7; Sheep or Half Morocco, \$8.

This book, the different articles of which are written by sixty-two mostly well-known authors, including the editors, is a most excellent addition to any doctor's library. Valuable alike to the older practitioner and to the student of ophthalmology, it can also safely be used by any practitioner as a reference hand-book. Every article is comprehensive and gives the most modern views on the subject it treats of. If there is anything we should have to criticise, it is that the book contains too much. Make-up and illustrations are of the best.

DISEASES OF THE EYE. A HAND-BOOK OF OPHTHALMIC PRACTICE FOR STUDENTS AND PRACTITIONERS. By G. E. DESCHWEINITZ, A.M., M.D. Illustrated with 225 engravings and 2 chromo-lithographic plates. Third Edition, thoroughly revised. Philadelphia. 1899. W. B. Saunders, 925 Walnut St. Price: Cloth, \$4; Half-Morocco, \$5.

While in the general arrangement the third edition of this well-known and so deservedly well-received text-book seems to be the same, it has been augmented by quite a number of paragraphs on new subjects, particularly concerning the bacteriology of the conjunctiva and cornea. We can only reiterate the praise which we bestowed on this book in its former editions.

OCULAR THERAPEUTICS FOR PHYSICIANS AND STUDENTS. By F. W. M. OHLEMAN, M.D. (Minden, Germany). Translated and edited by CHARLES A. OLIVER, A.M., M.D. Philadelphia. 1899. P. Blakiston's Son & Co., 1012 Walnut St. Price, \$1.75.

The completest list of methods and remedial agents applied in the treatment of eye diseases is to be found in this book. It is methodically arranged and special subjects can therefore be easily referred to. The translator has done his English-speaking confrères a great service by his work. In a second edition it will be well to have the Latin somewhat improved in places.—(*aquæ chlorita*, *aquæ calcaria*, *hydrargyri chloridi mite*, etc.; also *synechiæ scintillans*, etc.).

TEXT-BOOK OF OPHTHALMOLOGY. By DR. ERNEST FUCHS, Vienna. Translated by DR. A. DUANE, New York. With 277 illustrations. Second American edition. New York. 1899. D Appleton & Co

At its first appearance Professor Fuchs' text-book has, by its completeness and excellent detail, not only won the highest encomiums in the ophthalmic press, but also gained an immediate popularity. It is, therefore, not so astonishing to see that this, the second American edition corresponds to its seventh German edition. The additional remarks of the translator are intended to make the book more useful to its American readers. It is most assuredly one of the best text-books on ophthalmology.

ATLAS OF THE EXTERNAL DISEASES OF THE EYE, Including a Brief Treatise on the Pathology and Treatment. By DR. O. HAAB, Zuerich. Translated from the German. Edited by G. E. DESCHWEINITZ, A.M., M.D. With 76 colored plates and 6 engravings. Philadelphia. 1899. W. B. Saunders. Price \$3.00.

Among the different atlases published from translations of German atlases (Lehmann) this one is of especial value to teachers and students in ophthalmology. While some of the colored plates are not all that could be desired, others are real works of art and good reproductions of nature. The text accompanying these pictures is thoroughly good.

PRACTICAL HAND-BOOK OF THE MUSCULAR ANOMALIES OF THE EYE. By H. F. HANSELL, A.M., M.D. and W. REBER, M.D. Illustrated with 28 engravings and 1 plate. Philadelphia. 1899. P. Blakiston's Son & Co. Price, \$1.50.

A concise and plain description of all that seems to be known about this subject with all its intricate problems. The book is practical and a safe guide to the student.

DIE MAGNET-OPERATION IN DER AUGENHEILKUNDE. NACH EIGENEN ERFAHRUNGEN. (THE MAGNET-OPERATION IN OPHTHALMOLOGY. FROM PERSONAL EXPERIENCE). By PROF. DR. J. HIRSCHBERG. Second Edition. Illustrated with 30 engravings. Leipzig. 1899. Veit & Co. Price, 4.40 marks.

More than 200 magnet-operations are detailed in this book, which should be read by every oculist. It is only natural that Hirschberg should prefer his own magnet to those constructed by others, and he shows that many a so-called Hirschberg magnet which was found to be wanting, was in reality not what it purported to be. Surely, the author is to be congratulated on the results obtained by his hand with his magnet.

ALT.

RETINOSCOPY (OR SHADOW-TEST) In the Determination of Refraction at One Meter Distance, With the Plane Mirror. By JAMES THORINGTON, M.D., Adjunct Professor of Diseases of the Eye in the Philadelphia Polyclinic and College for Graduates in Medicine; Assistant Surgeon to Will's Eye Hospital, Etc. Third Edition, revised and enlarged, with 43 illustrations, 12 of which are colored. Philadelphia. 1899. P. Blakiston's Son & Co., 1012 Walnut St. Price, \$100.

The third edition of Dr. Thorington's popular manual on "Retinoscopy" has just been issued. Its great success is shown by the fact that three editions have been called for in less than two years. This manual presents a clear and practical description of the shadow-test and is highly recommended to college students, post-graduates, and to ophthalmologists who desire to acquire at home a working knowledge of this invaluable method.

J. E. J.

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ORIGINAL ARTICLES.

A CASE OF TRAUMATIC ENOPHTHALMUS.

BY SWAN M. BURNETT, M.D., PH.D., WASHINGTON, D. C.

THE recession of the globe into the orbital cavity following severe traumatic injury to the orbital walls or the adjacent parts has been explained in various ways. It has been supposed that the trouble is trophic and due to interference with the vaso-constrictors of the sympathetic (Beer). Another theory is a cicatricial adhesion between the walls and the contents of the orbit (v. Becker). It has been assumed, again, that there is a contractile inflammation of the fatty tissue of the orbit (Nieden, Gessner). Still another theory refers it to fracture of the base of the orbit (Lang).

The following case is reported as a contribution to a further fuller study of this interesting condition :

Sam Anderson, a colored man, aged 43 years, was admitted into the Providence Hospital March 25, 1899, from Greenville, S. C., with a note from Dr. J. W. Bailey, of that city, giving a very meager history of a severe injury received during an encounter with a vicious cow, November 23, 1898. The exact manner in which the injury was received was not given, but there was as the result, when seen by him, a long deep wound over the right brow ; "the left eye was mashed flat, and the tear duct was practically torn out." There was great swelling of the eyelids and "an exceedingly stubborn conjunctivitis of the left eye." The wounds were sutured, but the

patient was not seen again for some time. The patient was soon after seized with la grippe.

When seen by me at the hospital on the above date he presented the appearance shown in the accompanying illustration made from a photograph. There is a deep shrunken cicatrix involving the outer third of the right eyebrow, extending slightly below on the temple and for some distance on the forehead above. There is quite a deficiency of bone, but it does not seem to extend into the orbital cavity. The move-



ments of this eye are unrestricted in every direction. The left eye is sunken deep into the orbit and the sulcus above the upper lid is enormously exaggerated, giving the appearance of a badly-fitting artificial eye that is nearly always noted in enophthalmus. The apex of the cornea is, in the right eye, about 1.5 cm. in front of the outer orbital angle, while in the left it is not more than 5 mm. beyond, a difference of at least 1 cm. The upward movement of the left eye is limited, the outward movement is still more restricted, while the motion downward is almost entirely lost; the movement inward is

about normal. The elevation of the upper lid is not so extensive as that of the right eye, but that may not be due to an involvement of the levator, but to mechanical causes. The palpebral opening is the same in both, that is, about 1 cm. when the eyes are in a state of rest, with fixation in the horizontal plane. The orbicularis acts normally. The corneæ in both eyes are normal, and the irides are healthy. In the right no fundus is visible, the vitreous being filled with a uniform dense opacity, most probably the sequence of a hæmorrhage. In the left there is a deposit, apparently of pigment, on the anterior surface of the lens near the periphery, down and out; otherwise the pupil is clear, and through this the nerve head is seen to be of normal color with a normal distribution of the retinal vessels, with the exception of some white streaks or bands which border the large veins below, due, most likely, to a hæmorrhage into the retinal tissue. In the right eye there is no vision, and light perception only in the outer field. In the left, fingers are counted at $2\frac{1}{2}$ meters.

From the history and present appearances it would seem that in this case there had been a plastic inflammation of the orbital contents with cicatricial contraction which binds some of the muscles in the mass and limits their action. There has also been an absorption of much of the orbital fat. It hardly seems likely that there has been a fracture of the floor of the orbit, as no account is given of a bleeding from the nose, which Lang regards as an important symptom of that condition. That a pressure severe enough to set up an orbital cellulitis and even cause a rupture of the retinal vein, should not have left more evidence of injury upon the globe itself is a remarkable feature of the case, as it is in most instances of the kind that have been reported.

NITRIC ACID AS A CAUTERY IN CORNEAL ULCERS.

BY J. S. JOHNSON, M.D., ANN ARBOR, MICH.

TO discuss the treatment of corneal ulcers would be equivalent to writing a text-book chapter and is further-reaching than my intent or desire. But it is generally conceded that a certain class of corneal ulcers require such treatment as constitutes cautery of some sort and degree; it may be the actual cautery or some active chemical agent.

The immediate results which we seek to obtain by any cautery are, primarily, destruction of necrotic tissue, stimulation to repair and, perhaps, incidentally antisepsis by the destruction of germs. The ultimate results desired are healing of the ulcer as rapidly as possible with the least possible opacity. Of all the different forms of cautery we have remaining in common use practically only two—the electro-cautery and silver nitrate. One of the chief desiderata of a corneal cautery of any kind must be that it shall be under our control and that we must be able to measure and limit its action. This is the test which has condemned most chemical cauteries and which even the electro-cautery has not passed to everyone's complete satisfaction. Between the two methods of applying it, namely, to apply the cold button to the ulcer and then turn on the current until the desired heat and effect are obtained, and the other method of making a quick and possibly erratic dab at the ulcer with a cherry-red electrode, you have to contend on the one hand with the possibility of overdoing the business by the first method, and on the other hand of not cauterizing the precise part desired. Both methods have their advantages, but neither is free from objection. Again, every practitioner does not have a battery or a transformer enabling him to use it, and even if he has them in his office they can not be carried about. Desiccation of the cornea, or even deeper parts, singeing of the eyelashes, etc., frequently occur, and are undesirable. Furthermore, the laity sometimes object to having "red-hot irons thrust into their eyes." Against silver

nitrate the objection is quite universally raised that the cicatrix is apt to be opaque.

A desirable cautery, then, may be said to have these qualities: It must produce the desired destruction of necrotic tissue and be stimulating to reparation; its action must be under perfect control; it must not leave an opaque cicatrix; it must be painless and the reaction moderate. If it be inexpensive and easily obtained, and free from most of the objectionable features above alluded to, this is so much more in its favor.

I am confident that in nitric acid we have an agent which fairly well fills these requirements if properly used. About ten years ago a friend first called my attention to a possible method of employing it as a corneal cautery. It was just what I had been in need of and I at once began to use it. It has more than fulfilled my most sanguine expectations. I have used it in hundreds of cases with the best possible results. I have induced several others to use it and they all report similar success. My cases have included a number of serpiginous ulcers and at least one case of marginal ulceration completely circumscribing the cornea and involving it deeply.

My method is this: Make a dilution of the chemically pure acid, varying in strength from 9 to 15 per cent, according to the effect desired. From some fine-grained soft wood shape a point suitable to the case. It may be round, flat, spoon-shaped or quite pointed, as indicated by the size, shape or situation of the ulcer. This wooden applicator is then thoroughly saturated with the dilute acid, care being exercised that no drop of the fluid depends from it or any material excess of the fluid adheres to it. Having cocainized the cornea, apply the saturated point deliberately to the ulcer, watching the effect until the whitening of the destroyed tissue shows that you have obtained the desired result; then wash with water or saline solution. The separation of the slough is speedy, and the employment of ordinary methods of after-treatment is not to be interfered with.

As a rule, the application is painless and the reaction moderate. The opacity of the cicatrix is as slight as by any other method, if not less. The remedy is inexpensive, easily accessible and can safely be repeated if necessary. I have had the objection raised that it is dangerous and not well un-

der control; it is perfectly safe and under the most perfect control in every way, and best of all, it is effectual. It is worthy of careful and impartial trial. I advocate it only after what must be admitted to be full probation, and because it seems to me to be pretty nearly without any champion, apparently because unknown. I do not wish to be understood as arguing or expecting it to displace the electro-cautery, but it is certainly a valuable addition to our somewhat limited resources for combating one of the most frequent and stubborn corneal affections.

I regard the exact method of application of vital importance, in order to limit its action and keep it under perfect control.

A WATER SCREEN FOR OPHTHALMOLOGISTS.¹

BY P. DE OBARRIO, M.D., BERLIN, GERMANY.

SPENCER tells us, that in the order of time ornament preceeds usefulness. This idea is so deeply rooted in the minds of man that a Patagonian Indian would spend more physical and mental energy for the acquirement of colored pigments to ornament his body with than he would for the purpose of sheltering his naked form from the bitter hardships of an arctic winter.

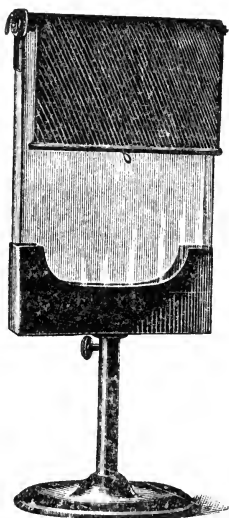
My object has been to produce a useful apparatus the æsthetical side of which has been of very secondary importance.

A great number of screens is in existence at present all of which have many inconveniences, principally that they do not protect in a convenient way from the annoying heat of our gas-light, and it is necessary at every moment to move the apparatus to one side whenever oblique illumination is to be made use of. Such metallic screens, after a short exposure to the heat of a lamp become in turn heated in such a way that their presence is more annoying than useful.

¹Presented to the Berlin Ophthalmological Society, March 23, '99.

Everyone who has had some experience in a clinic where he is required to examine a considerable number of patients in one afternoon, has, principally during the summer months, felt the necessity of having some useful contrivance that might protect him as well as the patient against this heat. If the heat could be avoided without interfering with the illumination, an ideal condition would result.

I have tried to do away with the different inconveniences of the older screens and to produce an apparatus which may be used as an opaque body, as a perfect screen against all rays, the luminous ones as well as those of heat, and which when necessary will permit the passage of the luminous rays while warding off completely the hot ones. (See figure).



The apparatus, as shown in the illustration, consists of a solid iron stand with a broad base; from the center of the round base rises a hollow metallic cylinder containing a steel rod with screws as a support to a thin metallic case, into this a glass case fits, which measures about $25 \times 20 \times 3$ cm., and is intended to contain water. On one of the sides of the glass case, on its upper margin, a curtain of black cloth is attached, having a spring arrangement, such as is used on window shades.

This apparatus can easily be moved in all directions and

be rotated on its vertical axis, but it is intended to be made stationary.

The water case, with its curtain, can be raised or lowered as may be desired or as circumstances may require, by means of the central rod in the cylinder and fastened with a side screw.

Having been placed on the table in a convenient position, between the luminous source and the patient's head, and the curtain being lowered, the apparatus serves as an opaque body shading off not only the light, but also heat rays. This is the way to proceed in order to make the ophthalmoscopic examination in the inverted image, which can be prolonged indefinitely, since the patient suffers no discomfort from the heat. In case of performing the examination with the erect image, the screen is placed in a somewhat oblique position; with this precaution the examination can be made without any difficulty.

For oblique illumination the apparatus is of still greater advantage. In this case, as in the previous ones, the screen remains in place, the only thing to be done is to touch the curtain spring and allow the curtain to roll up, thus permitting the passage of the luminous rays through the clear water, and preventing entirely the passage of any heat.

The apparatus has been solidly constructed by Mr. G. Sedow, of Berlin, according to my directions. Each single part can be separated from the others in such a way as to permit of a solid and secure package for transportation.

The manufacturer has succeeded in producing an apparatus the price of which places it within the reach of all.

This apparatus has been in use for a long time and has rendered good service, as is proven by the great number which are now in use.

CLINICAL MEMORANDA.

A CASE OF EPITHELIOMA OF THE EYELID, WITH MICROSCOPICAL SECTION OF THE TUMOR.

BY H. MOULTON, M.D., FORT SMITH, ARK.

EPITHELIOMA appears, perhaps, more often on the eyelids than elsewhere. The lower lid is its favorite site. The case I here describe is of special interest, because:

1. Of its location on the upper lid.
2. Its early recognition before ulceration began.
3. Because of the microscopical specimen, I am able, through the courtesy of Dr. Epler, to present, in proof of its character.

January 3, 1899, Mrs. B. F. A., aged 61 years, consulted me for a slight conjunctivitis. A small, wart-like excrescence, no larger than a pin's head, was observed on the margin of the upper lid about 1 cm. from the punctum lachrymale; it occupied the space between the free edge of the palpebral conjunctiva and the lashes, in such a position that in the movements of the lids it touched the bulbar conjunctiva and the cornea.

A collyrium of sulphate of zinc relieved the conjunctivitis, which, however, showed a disposition to recur at intervals. In the meantime the little tumor increased in size, and early in March its removal was consented to; but the operation was deferred, owing to the development of erysipelas of the scalp, which was treated by Dr. E. H. Stenenson.

Early in April the case was considered safe for operation, which was accordingly done on the 8th, with the assistance of Dr. J. C. Amis. By this time the tumor had spread along the edge of the lid until its length was about 7 or 8 mm., its breadth 2 mm. and the elevation about 2 mm. Small crusts

were forming on its surface; it was movable upon the tarsal tissue, but owing to its pronounced increase in size and suspicious appearance, it was decided to make its removal thorough.

A 4 per cent. solution of cocaine was dropped into the eye and a few minims were injected into the lid with a hypodermic needle; a lid clamp was applied and the growth cut away, the incision being always beyond the growth, in healthy tissue.

A V-shaped gap was left in the skin and muscle down to the tarsal tissue, which was not molested. The broad part of the gap occupied the free border of the lid. Some of the conjunctival surface, and a broad tuft of eye-lashes were removed. The edge of the lid was now split on each side to allow the skin to slide, and three sutures closed the gap; the healing was smooth.

Up to the present there is no recurrence, whether there will be or not, further time will tell.

It is said that after thorough removal malignant tumors are less likely to recur in this situation than in others.

MEDICAL SOCIETIES.

PROCEEDINGS OF THE SECTION OF OPHTHALMOLOGY OF THE AMERICAN MEDICAL ASSOCIATION.

MEETING OF JUNE 6-9, 1899, AT COLUMBUS, OHIO., DR. C. A. WOOD, CHAIRMAN, IN THE CHAIR.

REPORTED BY H. MOULTON, M.D., OF FORT SMITH, ARK.

It is impossible in this report to give all the excellent papers the extended notice they deserve.

The Chairman's able address was in printed form and distributed among the members without being read. It dealt exclusively and in a happy manner with the question:

How may the Ophthalmic Section do the Most Effective Work?

The following papers were read:

Treatment of Trachoma by Cupric Electrolysis, by George F. Keiper, Lafayette, Ind.

Dr. Keiper applies a metallic copper electrode with a weak current (5 ma.) to the granulations, claiming a deeper penetration and more rapid cure than when the bluestone crystal is applied without electrolysis.

Discussed by Drs. Huizinga and Lucien Howe. The latter thought that $\frac{1}{2}$ to 1 ma. was a strong enough current to use when applying the copper to the lids.

Seeing the Capillary Circulation in One's Own Retina, by O. E. Norton, Lewiston, Me.

The author minutely described an entoptic phenomenon observed by looking at the clear sky through a piece of blue glass, which is said to be distinct from muscæ volitantes.

Discussion.—Dr. G. M. Gould has not seen the phenomenon nor made the experiment, but he can not understand how the media of the eye can magnify the shadows of the red

blood corpuscles sufficiently to be seen by the retina. He has been able to see the shadows of the capillaries themselves.

Dr. Jackson pointed out that a blood corpuscle in a capillary of the retina would, by its shadow, produce an image as large as itself on the retina, and feels sure that he has identified blood corpuscles in his own eyes. The conditions are very different from what they would be if the blood corpuscle being looked at was outside of the eye.

Nutrition of the Crystalline Lens and Its Relation to Cataract Formation, by Lewis Stricker, Cincinnati, Ohio.

Dr. Stricker advanced the idea that nutrition of the lens is promoted by the action of accommodation and that this beneficial influence must be much interfered with when age makes the lens hard and resistant. The subject was very learnedly dealt with in all its phases.

Dr. Thompson (Indianapolis) observed that slight opacities at the lower inner margin of the lens never develop into cataract. He had watched them many years.

Dr. Gifford (Omaha) confirmed Dr. Thompson's observations.

Drs. Ayres and Morrow also discussed the paper.

Excessive Myopia: When May We Operate and What May We Expect? by Andrew Timberman, Columbus, Ohio.

The author referred to a case of his own and to Von Hippel's 114 cases and concluded that the operation has come to stay in proper cases.

Quinine Blindness in a Young Child, by H. Moulton, Fort Smith, Ark.

The case was that of a child, 3 years old; 90 grains of the bisulphate of quinine were given in four days, and the characteristic symptoms of quinine blindness from ischæmia followed. The blindness lasted twelve weeks; yet recovery of fair central vision followed. The pathology as elucidated by DeSchweinitz and Holden was stated, viz, degeneration of the ganglion cells and nerve fiber-layers of the retina, followed by ascending degeneration of the fibers of the optic nerves.

Dr. DeSchweinitz agreed with the essayist in his description of the pathology of quinine blindness, and thought the original contraction of the blood vessels might be explained by the action of highly cinchonized blood on their local vasomotor apparatus. He had analyzed more than 100 cases of

quinine blindness. With one exception he thought Dr. Moulton's case was the youngest on record. Although the blindness from quinine was primarily often complete, recovery usually took place in human beings, although there commonly remained some contraction of the visual field, and the color-sense was deficient. Permanent blindness, however, had occurred, as in the cases of Claiborne and Calhoun. The therapeutic agents valuable in quinine blindness were nitrate of amyl, nitroglycerin, strychnia and bromide of potassium.

Dr. Savage referred to a case which was typical except that in the fields there were islands of vision.

Dr. Thompson thought the malarial poison might be a factor in the blindness in such cases.

Dr. Baker (Bay City, Mich.) recommended bromide of potassium as a remedy.

Dr. Minney (Topeka, Kan.) reported a case of permanent blindness from 80 grains of quinine.

Dr. Baker (Cleveland, Ohio) alluded to the fact that he had never seen blindness from quinine, even when given in large doses.

Secretion and Exudation Considered as a Factor in Diseases of the Eye, by John W. Wright, Columbus, Ohio.

Examination of the Vision and Color Sense of Railroad Employes, by C. H. Williams, Boston, Mass.

Dr. Williams exhibited test-type and a lantern with diaphragm exposing different colors for the test of vision which he had recommended and which had been adopted by the New Haven Railroad.

Dr. Gifford thought that all new railroad employes should be examined with the ophthalmoscope.

Dr. Allport thought these examinations ought always to be made by an ophthalmologist, not a non-professional employe.

Drs. Randall, Keiper, Jackson and Reynolds also joined in the discussion.

Report of Seven Cases of Retinal Sequelæ of Diseases Affecting United States Troops in Cuba and Puerto Rico, by W. K. Rogers, Columbus, Ohio.

Some Points in the Diagnosis and Treatment of Diseases of the Sinuses Adjacent and Accessory to the Orbit. An address by invitation by Charles Stedman Bull, New York City.

Dr. Bull, in part said: In frontal sinus empyema transillumination is very uncertain as a means of diagnosis. In operating he uses a small trephine and enlarges with a gouge, and, if necessary, opening into the other side with a gouge. Drainage is established into the nose. The external wound is, after irrigation, closed completely with sutures. Intra-nasal treatment alone is futile. In the maxillary antrum empyema is often caused by diseases of the teeth. He advocates a large opening in the canine fossa with cocaine; then through the internal wall of the antrum an opening, by a trephine, into the nose, and introduces a drainage tube so as to drain the antrum through the nasal opening and the nose. The opening in the canine fossa is then allowed to close. The speaker stated that the prognosis in all forms of orbital malignant tumors is bad, but especially of those that originate in one of the sinuses.

Eye Troubles Attributable to Naso-Pharyngeal and Aural Disturbances, by Joseph A. White, Richmond, Va.

Dr. White's paper was an exhaustive resumé of the subject, in which timely attention was directed to its importance. As regards the pathological influence of the ear on the eye, from what we have before us, the author concluded that it really exists and is exerted by both direct and indirect propagation by way of the nerve tract and by the blood current.

Discussed by Dr. Holmes, of Cincinnati, Ohio.

Diseases of the Accessory Sinuses in their Relation to Diseases of the Eye, by J. H. Bryan, Washington, D. C.

Dr. Bryan's paper was read by Dr. Randall, of Philadelphia, Pa.

Analysis of Cases of So-Called Chronic Glaucoma, With Special Reference to the Visual Field, by George E. DeSchweinitz, Philadelphia, Pa.

The author especially called attention to the occurrence of scotomata in chronic glaucoma and to the fact that these scotomata preceded a break in the field corresponding to their site. The rule that contraction of the field is greatest nasally does not hold good in a large number of observations. An average of 184 charts shows concentric contraction, or that the greatest contraction is as liable to be in one part of the field as another.

Discussed by Drs. Lyman Ware, Thompson (Indianapolis) and Connor.

Dr. Eugene Smith favored sclerotomy in the treatment of chronic glaucoma.

Dr. Tiffany corrects hypermetropia and applies dry electric heat and miotics.

In closing, the author advocated the careful investigation of the field before ordinary symptoms were manifest, with the hope of discovering some defect which would lead to successful prophylactic treatment.

Cyst of the Iris Following Iridectomy for Cataract Extraction, by S. C. Ayres, Cincinnati, Ohio.

Dr. Ayres excised the cyst, with recovery of the eye.

Dr. Clark reported an unusual case in which simple puncture cured without recurrence for seven years.

Dr. Dudley Reynolds had punctured a case in which panophthalmitis followed,

Experiences in Operations for Secondary Capsular Membrane, by J. M. Ray, Louisville, Ky.

Dr. Ray's paper was discussed by Drs. Thompson, Weeks and others.

Report of a Case in Which Both Eyes Were Lost From Intraocular Hæmorrhage After Cataract Extraction, by Albert R. Baker, Cleveland, Ohio.

Significance of Certain Rare Forms of Ametropia, by S. D. Risley, Philadelphia, Pa.

Dr. Risley spoke of the necessity of correcting in many cases the full amount of error in each eye where there is even great anisometropia, and even when one of the eyes has not been habitually used, in order to relieve local and reflex symptoms and check pathological changes in the fundus.

Management of Cases of High Anisometropia, by Edward Jackson, Denver, Col.

Dr. Jackson said it is almost always possible to do something to aid the worse eye even when a full correction is not acceptable. The speaker included cases of astigmatism, with differing axes, as well as cases of differing degrees of refraction under the head of anisometropia, for differences in shape of the images in the two eyes are as annoying as differences in size. Often, in high anisometropia, partial correction of the difference must first be given and afterwards gradually increased. In H. of one and M. of the other eye, with a total

difference of not less than 12 D. the extraction of the lens of the myopic eye is suggested.

Astigmatism After Cataract Extraction, by F. C. Clark, Columbus, Ohio.

Dr. Clark presented facts and statistics tending to show that extraction preceded by preliminary iridectomy is less likely to be followed by marked astigmatism than is simple extraction. This superior result, as far as astigmatism was concerned, was obtained at a great sacrifice in perfect acuity of vision, there being only six cases with $\frac{20}{xx}$, when preliminary iridectomy was performed in the series of thirty cases as against eighteen when simple extraction was performed, yet the general average of vision is about the same by each method.

On Very High Astigmatism, by F. B. Schneidemann, Philadelphia, Pa.

The author, after discussing the subject in a general way, reported a case of high astigmatism which required :

R. + 2 \bigcirc — 20 c. axes 15° , V. = $\frac{16}{xxx}$.

L. + 2, — 20 c. axes 178° , V. = $\frac{15}{xl}$.

This correction was worn with comfort.

Surgical Treatment of High Myopia, by H. V. Wuerdemann and W. R. Murry, Milwaukee, Wis.

The authors referred to the small per cent. of high myopes seen by American ophthalmic surgeons. The results of their personal experience and the study of the literature justify the claims made in favor of the operative treatment.

Dr. Rodgers (Providence, R. I.) doubts whether the field of usefulness of operative treatment of high myopia is as wide as is sometimes thought.

Drs. Savage, Hubbell, Hale, Lippincott, Connor, Allport, Young, Lautenbach and several others also joined in the discussion of the five preceding papers.

In closing, Dr. Risley wished to be understood as discouraging the operative treatment of high myopia

National Recognition of Eye-Strain Reflexes, by George M. Gould and Helen Murphy, Philadelphia, Pa.

The Papillitis Accompanying Brain Tumor, by John E. Weeks, New York City.

The author dealt with the subject in such an exhaustive and classical way that a just notice is not possible in this limited space.

Some Clinic and Pathologic Notes on Migratory Ophthalmia, by Harold Gifford, Omaha, Neb.

Dr. Gifford observed two cases from the first development of symptoms in the sympathizing eye. There was no sympathetic irritation preceding the outbreak of inflammation, and in spite of the failure to find germs in the injured and enucleated eyes the author holds, nevertheless, that sympathetic inflammation is an infectious process. His treatment is with large doses of salicylate of soda (15 grains every three hours).

Dr. Williams (Boston) had used aqueous solution of suprarenal capsule in the beginning of sympathetic irritation (?) dropped in the eye three times a day, with complete disappearance of symptoms.

Dr. Lippincott (Pittsburg Pa.) advocates subconjunctival injections of bichloride of mercury.

The following are the titles of further papers read at this meeting:

Value of Cycloplegia in Optometric Examinations, by C. M. Culver, Albany, N. Y.

Vasomotor Sedatives and Their Uses in Ophthalmology, by David W. Stevenson, Richmond, Va.

Demonstrations of Moist Specimens, Showing Relations of Accessory Sinuses to Orbit, by C. R. Holmes, Cincinnati, Ohio.

Concerning the Bacteriology of Acute Catarrhal Conjunctivitis, by C. A. Veasey, Philadelphia, Pa.

Mucocele of the Newborn, by Clark W. Hawley, Chicago, Illinois.

The Phorometer, or Maddox Rod; Which? by Alvin A. Hubbell, Buffalo, N. Y.

Dr. H. V. Würdemann, of Milwaukee, Wis., was elected Chairman for the ensuing year, and Dr. C. F. Clark, of Columbus, Ohio, Secretary.

PROCEEDINGS OF THE OPHTHALMOLOGICAL
SOCIETY OF THE UNITED KINGDOM.

H. R. SWANZY, F.R.C.S.I., President, in the Chair.

THURSDAY, MARCH 9, 1899.

IMPLANTATION CYSTS OF THE IRIS.

MR. DEVEREUX MARSHALL recorded three cases of epithelial cysts of the iris which he had recently examined, and showed photographs in the lantern of the points of interest which each exhibited.

1. A boy, aged 12 years, whose eye was wounded eight years before. It remained quiet until three months before removal, since which time it had been painful and irritable. There was found to be a crescent-shaped scar of the cornea, to which the iris was adherent. At the bottom of the anterior chamber there was found a large cyst. On further examination the walls were found to be formed by the iris, which was split into two unequal parts; the iris itself was so atrophied that at one place the wall was composed solely of epithelium.

2. A youth, aged 17 years, whose eye was wounded several years ago with a piece of wood. It remained quiet until it received a severe blow two weeks before removal. A small cyst was then found at the upper and inner part of the anterior chamber. The anterior wall of this was composed of an extremely thin piece of atrophied iris lined with epithelium and adherent to Descemet's membrane. Its posterior wall was composed of the greater part of the thickness of the iris; the epithelium was laminated, and similar to that of the cornea.

3. A man, aged 29, whose eye was wounded some years before, and had recently become painful and quite blind. The eye was enucleated, and in the anterior chamber was found a small mass near the inner corneo-scleral junction. It had developed in the muscular part of the iris. The cyst was found to be lined with epithelium which had undergone great proliferation, so much so that its cavity was filled with degenerated epithelial cells which had become shed, and having no place of escape had become collected together in the interior of the

cyst, thus giving rise to the dense white appearance noted during life. The epithelium in this case apparently arose from a portion of cutis which had become driven in at the time of the original accident, whereas in the other cases the epithelium of the cornea was almost certainly the cause of cystic development.

The question of cysts in general was shortly discussed, and some museum preparations of the eyes illustrating the subject were shown.

MR. TREACHER COLLINS said these cysts varied greatly in situation; they were sometimes found in the substance of the cornea, sometimes in the anterior chamber after cataract extraction, sometimes in the iris itself, being occasionally caused by development of the root-sheath of an eyelash carried into the eye. They were also found in the vitreous, beneath the conjunctiva, and in the orbit. They might be classified as deeply pigmented and unpigmented, the former ones being due to a separation of the two uveal layers of the iris, the latter, or unpigmented ones, being either mesoblastic, due to dilated crypts of the iris, or due to epithelial inclusion after injury, in which case their contents might be either clear or sebaceous, according to the source of the included epithelium.

GREEN VISION IN A CASE OF TABES DORSALIS.

MR. WORK DODD related the case of an artist, aged 32 years. In 1886 his sight was quite good; in 1891 he had diplopia, from which he recovered. His color vision remained good until 1897, and he complained of defective sight shortly before being seen in July, 1898. When first seen vision was R. E. $\frac{2}{LX}$, L. E. $\frac{1}{LX}$. He had Argyll-Robertson pupils, optic atrophy, and contraction of his visual fields, his gait was ataxic, and he had occasional trouble in passing water. In September, 1898, V. was reduced to R. E. $\frac{1}{LX}$, L. E. hand movements. He then saw everything a bright emerald-green; it appeared to him as if there was a green veil hung before his eyes, through which he saw everything; he occasionally saw rose-pink spots through the green veil in places. The color increased in intensity when he was tired, especially the rose-pink. He had also occasional sensations of very brilliant light.

ALBUMINURIC RETINITIS IN A CHILD.

MR. ARNOLD LAWSON and DR. SUTHERLAND read a further note on a case. A girl, aged 12 years, was exhibited before the Society last year with advanced albuminuric retinitis in both eyes, and symptoms of chronic interstitial nephritis. Two weeks after she was shown to the Society she had uræmic convulsions and absolute blindness, which lasted some days. During the next few months she had headache and vomiting, but no more uræmia. In September she was readmitted to the hospital for cardiac failure; death followed. The whole duration of the illness had been a year and three-quarters. Post mortem both kidneys were found granular; the heart was hypertrophied, and there was a cerebral hæmorrhage into both ventricles. In the retina exudation of the usual type was found at the central region. Congenital syphilis was suggested as a cause.

MR. HOLMES SPICER thought the suggestion of congenital syphilis as a cause was interesting. He had now under his care a female, aged about 20 years, who had interstitial keratitis in both eyes a few years ago, and other evidence of congenital syphilis. In the last few months she had developed very marked sclerosis of her retinal arteries, which presented the typical gold-wire appearance; she had retinal hæmorrhages, and flocculent masses of retinal exudation. Albuminuria was also present.

In reply, Mr. Lawson said that Dr. Guthrie, who had made the post mortem examination, had found this condition present in children in many cases, and he believed it to be almost always due to congenital syphilis.

STRABISMUS FIXUS.

MR. E. DONALDSON reported a case. A female, aged 46 years, had had convergent squint since childhood; the deviation was so great that the left cornea was almost hidden; under an anæsthetic the eye could not be drawn out, and it was impossible to reach the internal rectus to divide it. The other eye was also fixed in a strongly convergent position, but it was possible to divide the internal rectus; by separating Tenon's fascia freely from the globe the position of the eye

was much improved. Snellen has published some cases all of which were congenital; the condition has been named strabismus fixus by von Gräfe, but the cause was unknown.

THURSDAY, MAY 4, 1899.

H. R. SWANZY, F.R.C.S.I., President, in the Chair.

CLINICAL EVENING.

TUMORS OF THE IRIS.

MR. A. M. THOMPSON showed a microscopic section of a tumor from a case which had been shown at a previous meeting of the Society. The portion of the iris containing the tumor was removed, and the patient now had $V.=\frac{6}{VI}$ in the eye. The tumor was probably a spindle-celled sarcoma.

MR. TREACHER COLLINS showed a case in which the tumor occupied the upper inner part of the iris, and the lens was cataractous. The patient was a woman, aged 63 years, who had had a black spot in the eye since childhood. The piece of iris was removed and the cataract extracted at the same time. The growth consisted of large endothelial cells with sharply-defined nuclei. It resembled in structure pigmented moles of the skin, and was probably innocent.

MR. JOHN GRIFFITH thought Mr. Thompson's case was a myoma from the rod shaped character of the nuclei, and that Mr. Collins' case was a large round-celled sarcoma.

UNUSUAL FORM OF OPACITY OF CORNEA.

MR. TREACHER COLLINS showed an example of this condition. It was present in both eyes, but was more marked in the left. It had much the appearance of a broken cobweb stretched across the cornea; the lines were in the corneal substance. They were possibly the tracks of old blood vessels after interstitial keratitis, but they were very wide for blood vessels, and did not extend to the periphery of the cornea.

MR. JULER thought they were tracks of old blood vessels; there was a suspicion of scarring at the angles of the mouth

which he thought made previous interstitial keratitis probable.

MR. BREUER thought they were the lines which were sometimes seen in the superficial punctate keratitis described by Fuchs.

MR. SILCOCK suggested that they might be blocked lymphatic vessels which had resulted in bands of fibrous tissues.

DR. HILL GRIFFITH asked if the possibility of the lines being due to a vegetable fungus had been considered.

VASCULAR FORMATION IN THE VITREOUS IN DIABETES.

MR. ARNOLD LAWSON showed a patient who had been known to be diabetic 3 years; his sight had failed 2 years in the right eye and 6 months in the left. The right lens was opaque; in the left eye there was at first a vitreous haze which obscured the details of the fundus. As this cleared there was found a connective-tissue formation consisting of feathery tufts proceeding from a central stalk, richly supplied with blood vessels.

SLOUGHING OF CORNEA RAPIDLY FOLLOWING ON FRACTURE OF THE BASE OF THE SKULL.

DR. LEDIARD showed a man, aged 38 years, who had been knocked down by an engine. When first seen he was semi-comatose; he had right facial paralysis, the eye remaining open, severe scalp wound, and the escape of cerebro-spinal fluid from the ear; the fifth nerve was uninjured. Notwithstanding the care that was taken of him his cornea sloughed, and the eye had to be excised. The probable reason for the sloughing was the exposure of the cornea consequent on the facial paralysis, and the condition of semi-insensibility induced in the cornea by the partial coma.

PRIMARY CARCINOMA OF EYEBALL.

MR. SIMEON SNELL (Sheffield) showed this specimen. The patient was a man, aged 69 years. There was a history of an injury to the eye (cornea) 14 years before. When first seen

almost the whole of the cornea was involved in a nodulated, hard, irregular growth. Careful examination failed to disclose any growth elsewhere in the body. The eyeball was enucleated, the orbit cleared out, and chloride of zinc paste applied to the socket. The growth had perforated the globe posteriorly. Mr. Treacher Collins kindly examined the eyeball, and reported that the appearances of the growth were typically those of carcinoma, and that it originated within the globe, but in which structure it was impossible to say.

MR. COLLINS said that it was formerly the opinion that growths primarily occurring in the eye were sarcomata or gliomata, but it was known now that carcinomata occurred starting from the tubular glands of the ciliary body; they might also start in the pigment epithelium of the iris and choroid; he thought Mr. Snell's case probably originated in the ciliary body.

MR. SILCOCK had seen orbital tumors having a structure similar to the one in question; possibly these might be endotheliomata and not epitheliomata.

MR. BRONNER remarked that as visceral carcinoma might exist for a long time without revealing itself, one ought to be cautious in accepting a carcinoma in the eye as a primary growth.

MR. JESSOP asked whether there had been any recurrence.

CARCINOMA OF THE EYE SECONDARY TO THAT OF THE LUNGS.

MR. JOHN ROWAN showed a specimen of scirrhus cancer occupying the lower part of the fundus, and detaching the retina; its origin was in the glands or mucous membrane of the bronchi; the primary and secondary growths were similar in character.

TRAUMATIC PTOSIS.

MR. SNELL showed a stereoscopic photograph of a case of traumatic ptosis.

PIECE OF GLASS LOCALIZED IN THE EYE BY MEANS OF THE ROENTGEN RAYS.

MR. MACKENZIE DAVIDSON showed this specimen. A fragment of a Florence flask, during a chemical experiment,

went into the patient's eye. It was shown by the *x*-rays quite clearly, but was less dense than metal in appearance. The only modification of the method used in this case was that the rays were passed obliquely through the eye, so as to avoid bone as much as possible.

EYEBALL WITH FRAGMENT OF STEEL LODGED IN ITS COATS.

MR. GEORGE MACKAY showed this specimen with skiagraphs. A traumatic cataract had been formed, which was removed, leaving the media clear. The position of the foreign body could be seen by the ophthalmoscope. As it appeared to be encapsuled it was not interfered with; after an interval of quiescence the vision failed, and the eye became irritable; the iris had a tawny brown color. Removal of the foreign body by the magnet failed. After enucleation it was found fastened to the coats of the eye. In order to trace the parts of the eye discolored by the rust of the iron Prussian blue was formed with it; the corneal epithelium and the filtration angle were the parts most widely stained. Descemet's membrane escaped.

SOLID ŒDEMA OF THE EYELIDS.

MR. ANDERSON CRITCHETT showed a case. The patient had erysipelas in 1894, followed by another attack later. Fullness of the lids followed; they were treated by pressure, puncture and incision, without benefit; the mass had been excised by Mr. Higgins, but had recurred.

MR. EYRE had photographed the same case five years before. At that time the upper lids were more swollen than the lower. He had seen seven similar cases, all of them after erysipelas.

Messrs. Frost, Silcock and Mackay spoke of cases.

ARTIFICIAL EYES.

MR. CRITCHETT also showed samples of Snellen's artificial eyes.

FILAMENTARY KERATITIS.

DR. RAYNER BATTEN showed a woman, aged 29 years, who

had had chronic conjunctivitis one year. A number of threads were seen hanging from the surface of the cornea near its edge, they were about 1 mm. long, and consisted of a twisted rope of epithelium. No vesicles were seen. They were symmetrical in the two eyes.

ORBITAL TUMOR.

MR. JULER showed a case. There was a history of proptosis for two months. A fluctuating tumor was felt at the upper inner margin of the right orbit; dark blood escaped on tapping it; he thought it was a vascular sarcoma.

MR. LAWFORD asked if the nose had been explored, as the case might possibly be a distended ethmoidal cell.

MR. LANG had met with a similar case consisting of broken-down nævoid tissue.

THURSDAY, JUNE 8, 1899

H. R. SWANZY, F.R.C.S.I., President, in the Chair.

A CASE OF OBLITERATION OF A BRANCH OF THE RETINAL ARTERY FOLLOWING FREQUENT ATTACKS OF TEMPORARY AMBLYOPIA.

DR. C. E. BEEVOR and MR. MARUS GUNN read this paper. The patient, a man, aged 34 years, had suffered since childhood from temporary attacks of amblyopia lasting a few minutes, and involving especially the right eye, but unattended by headache. About 9 months ago, after violent exercise, he had an attack in which the blindness of the right eye was followed by loss of the superior half of the visual field of the right, which had persisted, and part of the periphery of the lower half of that field. At present, on ophthalmoscopic examination, there was atrophy of the lower half of the right disc, with shrinking of the branches of the lower half of the arteria centralis retinae. He had occasional attacks affecting the left eye, and in one he temporarily lost the lower half of the field of vision of the left eye. There were no other symptoms except that the right knee-jerk was very deficient and difficult to obtain. The case was considered to be an unusual condition of

complete obstruction of a retinal artery that had previously been liable to recurrent temporary constriction.

RECOVERY OF SIGHT AFTER PARTIAL OCCLUSION OF THE
CENTRAL ARTERY.

MR. J. B. STORY reported the following case: Mr. H., aged about 35 years, was attacked with blindness of the left eye on December 26, 1898, and was first seen on January 5, of this year. Externally the eye was normal in appearance, but the pupil did not act to light; vision was reduced to a perception of light. The optic disc was hazy, the arteries were thread-like, and there was a slight cherry color at the macula, as is seen in typical cases of embolism. Inhalation of nitrite of amyl produced some redness of the fundus, and arterial and venous pulsation could be produced by pressure. The patient was apparently healthy and was not rheumatic; his heart was not examined. Iodide of potassium was ordered internally, with daily inhalations of amyl nitrite. After six days vision had become fingers at 3 m; small doses of corrosive sublimate were ordered. Two weeks after (January 23) the pupil was active and vision had become $\frac{5}{xx}$; the improvement had begun suddenly four days before. On February 7, vision had further improved to $\frac{5}{vii}$, and on April 18, it was $\frac{5}{v}$; ophthalmoscopically the eye appeared normal except for a faint perivascular line along the inferior retinal artery.

Miss J. W., aged 39 years, was first seen on February 20, of this year. The left eye had suddenly become blind a week before; the heart was normal, and her health was good. In the eye V. was fingers at 5 m., the pupil was inactive to light; the retinal arteries were reduced to threads. There was some œdema of the retina, and the veins were beaded. Trinitrine was prescribed. On March 8, there was no change in vision or in ophthalmoscopic appearances. On March 17, the pupil was active and vision was $\frac{6}{ix}$. On May 1, vision was $\frac{6}{viii}$, the left disc was slightly pale, and its edges slightly blurred; the arteries were small and the veins normal. The authors regarded both cases as examples of partial occlusion of the retinal artery.

MR. THOMPSON asked if endarteritis obliterans had been

excluded as a cause; it had been maintained that all cases of so-called embolism of the central artery had this cause.

MR. ARGYLL ROBERTSON spoke of a case in which there had been temporary obscuration in an eye; it was similar to Benson's case read before the Ophthalmological Congress at Edinburgh. He asked if Dr. Beevor had noticed the reaction of the pupil.

MR. JOHNSON TAYLOR spoke of a case in which there had been temporary blurring of the vision.

MR. PRIESTLEY SMITH said the point of practical importance was the warning frequently given by the transient nature of the earlier attacks in such cases, so that if the cause could be discovered we might prevent the onset of blindness. Many of the cases were reflex, and from overloading of the stomach; others were due to a blood condition, and were possibly of the same nature as migraine. He advised the use of salicylates and copious draughts of hot water; he also suggested the immediate use of antipyrin in such cases.

Messrs. Juler, Cant and Gunn spoke, and Dr. Beevor replied.

TRAUMATIC DIVISION OF BOTH OPTIC NERVES.

MR. KENNETH SCOTT related this case: An Egyptian, aged 23 years, was sent to the Kasr-el-Aini Hospital at Cairo after attempted suicide. A bullet had entered the right temple, transversed the head and passed out at the left temple; it had passed from side to side below the base of the skull in a direction downward and forward. Both eyeballs were completely protruded and lay on the cheeks, the right one hanging down 19 mm. and the left one 15 mm. Both eyes were dark discolored and flattened; it was obvious that both optic nerves had been torn across and the globes had been ruptured. The damaged eyes were removed, and it was found that both orbits had been traversed by the bullet, and the base of the brain had been shattered as there were fragments of bone and brain matter in the right orbit. The patient did not long survive the injury.

AMERICAN OPHTHALMOLOGICAL SOCIETY.

PRELIMINARY PROGRAM.

The Thirty-fifth Annual Meeting of the American Ophthalmological Society will be held on Wednesday and Thursday, July 19 and 20, 1899, at the Pequot House, New London, Conn.

Titles of the following papers have been forwarded to the Secretary:

1. A case of primary Tumor of the optic nerve, by Dr. Buller.
2. History of a case of removal of an orbital Sarcoma with preservation of normal vision, by Dr. Oliver.
3. A case of primary non-pigmented Sarcoma of the left upper lid, by Dr. Veasey.
4. An instrument intended to facilitate the operation of Capsulotomy, by Dr. Buller.
5. A case of expulsive-intraocular hæmorrhage after preliminary iridectomy for Cataract, by Dr. Randolph.
6. On anomalies in the Epithelial layer of the crystalline lens and anterior polar Cataract, by Dr. Alt.
7. Report of three cases of magnetic extraction of steel from the eyeball through the point of entrance, by Dr. W. B. Johnson.
8. A cyst of the Vitreous (with patient), by Dr. Tansley.
9. Congenital inefficient external Rectus and Binocular Vision (with patient), by Dr. Tansley.
10. Demonstration of office stereoscope, by Dr. R. H. Derby.
11. A case of sympathetic ophthalmia due to Glioma Retinæ in the fellow eye, by Dr. Alt.
12. Cases of Metastatic Panophthalmitis, by Dr. Millikin.
13. A case of spontaneous Rupture of the Eyeball, by Dr. Millikin.

14. Multiple rupture of sphincter of Iris with subsequent development of myopic astigmatism, by Dr. Mittendorf.

15. Some unusual cases of Secondary Glaucoma. by Dr. Bull.

16. Normal pupillary reaction—with microscope for its measurement, by Dr. L. Howe.

17. A clinical study of the ocular symptoms found in Posterior Spinal Sclerosis, by Dr. Oliver.

18. Report of a case of Keratectomy, by Dr. Kollock.

19. The value of Acoin as a local anæsthetic in Eye Surgery, by Dr. Randolph.

20. More uniform Tests for Vision, Color-Sense and Hearing, by Dr. Williams.

21. Injuries to the sight from blunt force applied near the orbit, by Dr. Spalding.

22. Remarks on the use of the wire shield and lid sutures in Cataract, by Dr. Prout.

23. A modified Perimeter, by Dr. Williams.

Members are requested to arrange for rooms direct with the Hotel management.

S. B. ST. JOHN,
Secretary.

BOOK REVIEWS.

DES VERRES PERISCOPIQUES ET DE LEURS
AVANTAGES POUR LES MYOPES (PERISCOPIC
GLASSES AND THEIR ADVANTAGE FOR MYOPES). By DR.
F. OSTWALT, Paris; with a preface by C. M. GARIEL.
Paris. 1899. George Carré et C. Naud, Editeurs.

In this volume the well known author gives a mathematical explanation, why periscopic glasses are to be recommended, especially to myopes, while they are of no advantage, according to him, in cases of hyperopia. The details must be studied by the reader.

ALT.

PAMPHLETS RECEIVED.

"Headaches," by A. D. McConachie, M.D.

"An Auxiliary Skiaskope," by E. C. Ellett, M.D.

"Nosophen in Ophthalmology," by K. Hoor, M.D.

"Infarction of the Heart," by W. Baumgarten, M.D.

"Clinical Tests of New Remedies," by S. S. Bishop, M.D.

"Annual Report of St. Francis Hospital," Columbus, Ohio.

"The Cause of Retinitis Pigmentosa," by W. Schoen, M.D.

"Cataract; Its Cause and Prophylaxis," by W. Schoen, M.D.

"A New Method of Autophthalmoscopy," by P. de Obarrio, M.D.

"Otology; Its Relation to General Medicine," by C. G. Lewis, M.D.

"Strabismus, Squint or Cross-Eye," by H. S. Paine, M.D.

"The Panas Operation for Strabismus," by D. B. St. J. Roosa, M.D.

"Recent Therapeutics in Ophthalmology," by R. S. Patillo, M.D.

"Extirpation of the Lachrymal Sac and Gland," by C. R. Holmes, M.D.

"New Instruments for Excision of the Tonsils," by W. H. Peters, M.D.

"Electric Dry Heat in Ulceration of the Cornea," by F. D. Tiffany, M.D.

"The Sterilization of Instruments with Formaldehyde," by H. O. Reick, M.D.

"A Case of Cavernous Angioma of the Conjunctiva," by H. O. Reick, M.D.

"Cerebral Hæmorrhage with Temporary Glycosuria," by R. B. H. Gradwohl, M.D.

"Note on Toxic Chromatopsia and Toxic Hysteria," by G. E. DeSchweinitz, M.D.

"Perichondritis and Necrosis of the Arytenoid Cartilage," by W. Scheppegregell, M.D.

"Grains of Experience Gleaned from Eye and Ear Practice," by E. C. Ellett, M.D.

"Report of the Hungarian Ophthalmic Literature of 1898," by E. von Grosz, M.D.

"Antinosine in the Treatment of Diseases of the Eye and Ear," by W. F. Coleman, M.D.

"Traumatism of the Eyeball, Involving the Crystalline Lens," by C. D. Wescott, M.D.

"Review of the Pathological Conditions Affecting the Lingual Tonsil," by E. C. Ellett, M.D.

"Blindness Following the Intoxicating Use of Jamaica Ginger.—Six Cases," by H. Woods, Jr., M.D.

"Manifestations of Syphilis in the Mouth," by L. D. Bulkley, M.D.

"Mastoid Complications of Exanthemata in Children," by E. B. Dench, M.D.

"A Case of Foreign Body (Piece of Steel) in the Optic Nerve," by Ch. A. Oliver, M.D.

"Discussion of Ten Thousand Eyes Examined for Refractive Error," by G. C. Pardee, M.D.

"An Improved Method for the Removal of Intra-Ligamentous Cysts," by T. H. Hawkins, M.D.

"The Influence of Irritation of the Localization in the Eye of General Disease," by W. Schoen M.D.

"Appendicitis or Salpingitis, with Complications, and a Report of Some Unusual Cases," by T. H. Hawkins, M.D.

"Restoration of the Conjunctival Cul-de-sac in a Case of Total Symblepharon, by Means of Thiersch Skin Grafts," by C. H. May, M.D.

THE AMERICAN JOURNAL
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OPHTHALMOLOGY.

VOL. XVI.

AUGUST, 1899.

NO. 8.

ORIGINAL ARTICLES.

ON ANOMALIES OF THE EPITHELIAL LAYER
OF THE CRYSTALLINE LENS AND
ANTERIOR POLAR CATARACT.¹

BY ADOLF ALT, M.D., ST. LOUIS, MO.

IN SPITE of all theories offered to explain the pathogenesis of anterior polar and pyramidal cataract it is still shrouded in as much mystery as is that of senile cataract. This is no doubt due to the fact, that the initial and earlier stages of the development of these diseases of the lens have been rarely, if ever, seen and studied histologically. Thus the attempts at explanation of their formation are still purely theoretical in character.

From the literature on this subject most of the observers like Hulke, Becker, Collins and others, agree on this one point, that a prolonged contact of the anterior lens capsule with the posterior surface of the cornea and the consequent interference with the normal osmotic processes through the capsule, forms the best explanation for the formation of *acquired* anterior polar cataract.

Furthermore, most observers acknowledge a *congenital* form of anterior polar cataract as distinct from the acquired form. Becker alone is strongly inclined to deny the congenital form and to assume, in apparently congenital cases, an

¹Read at the Thirty fifth Annual Meeting of the American Ophthalmological Society, New London, Conn., July 19 and 20, 1899.

intra-uterine perforation of the cornea and contact between this membrane and the lens.

Such a contact between the cornea and lens can, as a rule without exception, take place only when the aqueous humor has been lost, and this, again, only when the eyeball, more especially the cornea, has been perforated. The most frequent cause for such a perforation is probably an injury to the cornea. Frequently the healing of such a wound is a protracted one and the anterior lens capsule remains in contact with the cornea for days before an anterior chamber is re-established, and yet, I do not know that the development of an anterior polar cataract from this cause has been observed. Certainly more frequently we see a consecutive *general* cataract developing if the injury leads to pathological changes in the deeper structures of the eye.

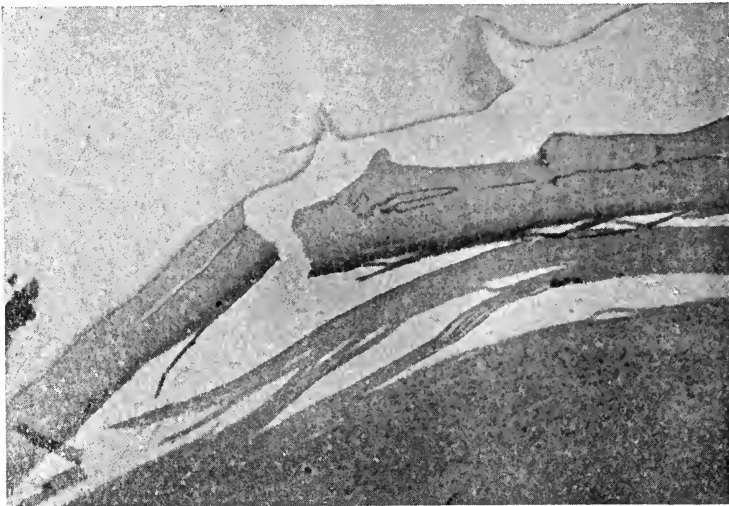


FIG. 1.

That a perforation of the cornea, due to an ulcerating process, may give rise to an anterior polar cataract, is a well-known fact. Yet, how small is the number of cases of ulceration of the cornea in which this takes place, when compared with the large number of cases of corneal ulceration and perforation in which no such sequel has been observed!

We know, furthermore, probably all of us, from our own personal observation, that now and then an anterior polar cataract may develop as the result of a blenorrhœa of the conjunctiva, or a keratitis, without perforation of the cornea. The formation of anterior polar cataract in such cases is explained by Hulke in the following words :

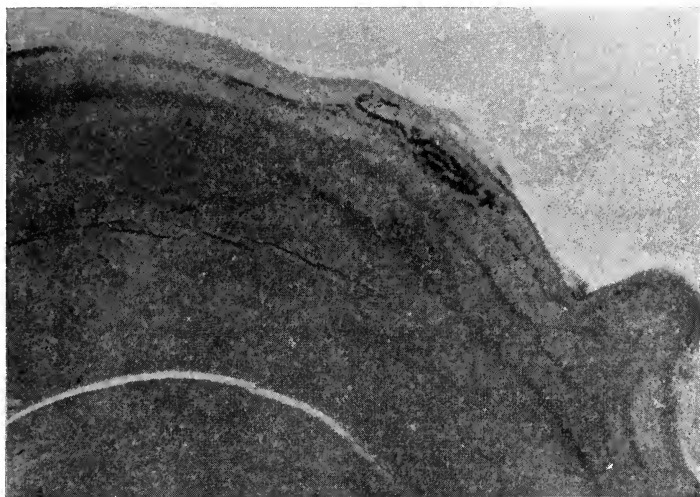


FIG. 2.

"In ophthalmia neonatorum, when the cornea has become inflamed and swollen, its posterior surface may actually come in contact with the front of the lens, and then a dot of lymph poured out upon the latter by the inflamed cornea, or even the mere pressure contact, may give rise to opacity by preventing the proper nutritional osmosis through the capsule; the little white cones which seem to project forward through the pupil in cataracta pyramidata, have their origin in this way."

I can not imagine that a cornea ever swells up so much in a backward direction that it could come in contact with, let alone press upon the lens; nor can we exactly understand how the pouring out of a dot of lymph from the inflamed, but otherwise intact, cornea can take place. Such occurrences have probably never been seen, and appear to be purely theoretical assumptions.

Hutchinson's criticism of Hulke's theory has more recently been further elaborated by Nuel, who gives his theory as follows: "In the newly-born, especially during a blennorrhœa, the pupil is very small, really only about 1 mm. in diameter. It follows, that just to that extent and corresponding to the shape of the pupil the anterior lens capsule is not protected against the afflux of phlogogenic substances by the iris, and this is exactly the place where, later on, the anterior polar cataract is located."

That later in life non-perforating ulcers of the cornea do not cause the formation of an anterior polar cataract, in his opinion, is due to the fact, that the capsular epithelial cells have arrived at a state of relative rest and are less apt to react by proliferation on similar exciting causes. When, however, the lens is bathed in pus, or when the lens, for a prolonged period, comes into contact with a cornea which is infiltrated with pus, even in the adult the resulting irritation may be sufficient to cause the formation of an anterior polar cataract.

He also assumes, that when a perforation of the cornea occurs during a blennorrhœa of the conjunctiva, even then the diffusion of these phlogogenic substances into the crystalline lens is the real cause of the subsequent anterior polar cataract.

It is my opinion, that contact between the anterior lens capsule and the posterior surface of the cornea, whether this membrane be otherwise healthy, or infiltrated with pus, even if it be prolonged, can not alone be the cause of the formation of an anterior polar cataract. If it was, it should occur at least now and then after a perforating injury of the cornea, and with more frequency and regularity after ulcerative perforation of this membrane.

Nuel's explanation of the occurrence of anterior polar cataract after blennorrhœa of the conjunctiva without corneal ulcerative perforation, by the influence of the phlogogenic substances on the part of the lens capsule exposed to them and corresponding in area with the infantile pupil, can not probably be perfectly correct in all cases, otherwise the opacity should always lie centrally, while in reality it is more frequently found to be situated excentrically.

All of these theories deal with the acquired polar cataracts. What of the congenital ones? Must we accept Beck-

er's theory of an intra-uterine corneal perforation? Surely we can not do so in cases in which several members of a family—as for instance, the father and several children, are born with anterior polar cataracts, and I know several such families from my own observation. If I remember right, Dr. J. Green reported quite a number of such cases in one family. I have also observed several times a lamellar cataract in one and an anterior polar cataract in another child of the same family, where there was no blennorrhœa, nor keratitis. There is then, surely, a congenital malformation of the lens appearing as an anterior polar cataract, which may even be transmitted by heredity.



FIG. 3.

This fact, then, seems to give us a clew to a missing factor in the causation and pathogenesis of anterior polar cataract in the so-called acquired form. At the same time, it seems, this will give us an explanation of why under, as far as we can judge, very similar or even like circumstances an anterior polar cataract will develop in one case and not in another.

I mean by this, that it seems to me that for an explanation of this fact we have, in all probability, to fall back on

some congenital malformation in the lens which, perhaps, in combination with the suspension of osmosis by contact between the cornea and lens (Hulke), or with the penetration of phlogogenic substances through a perforated or intact cornea into the lens (Nuel), may bring about the formation of an anterior polar cataract. This would, of course, not exclude the possibility of the development of an anterior polar cataract from the pre-existing malformation even without the agency of the other theoretically assumed factors.

In looking through the literature on this subject I have not been able to find any observations of such congenital malformations. I have been fortunate enough, however, in the course of my microscopical studies to find four eyes from two adult male individuals which seem to furnish such a missing link.

Having obtained these eyes from the dissecting rooms, I know nothing of their history. All of them showed a dimness of the anterior lens surface when the cornea was removed, one of them, besides, a small pyramidal cataract. The eyes were removed as soon as the bodies had been obtained and preserved in a 5 per cent. formol solution, afterwards hardened in alcohol and cut into sections after embedding in celloidin. That is, they were treated exactly like a great many other eyes which showed no similar conditions, which may be taken as proof that the hardening process did not produce these conditions, a suspicion which, I confess, at first arose in my mind.

The four lenses showed such a similarity of abnormal conditions, that it is unnecessary to describe each one separately.

Instead of forming the usual single and uninterrupted layer of cells lying closely in contact with and lining the anterior lens capsule and farther back to where the young lens fibers are formed, in these lenses these cells are very irregularly arranged. In parts they are separated for a lesser or greater distance from the lens capsule by a transparent, homogenous or finely granular substance; sometimes this substance lies as well in front as behind the cells. In other sections whole portions of the cells lie closely applied to the lens capsule, while smaller portions are separated from it. Sometimes there is an almost normal lining to the capsule, while one or more rows of cells run more or less parallel to it further back. In

a large number of sections these detached cells have evidently proliferated, yet not promiscuously in all direction, but in such a manner that their nuclei form a continuous chain which, however, probably from the limitation of space and the obstacles encountered, has been forced to form the queerest reduplications and convolutions, wavy and even spiral lines, and hooks.

This abnormal and irregular arrangement of the capsular epithelium is in the different sections seen to affect all its parts, as far back even as to where the lens fibers start. In a number of sections isolated cell-convolutions are found even farther back on the inner surface of the posterior lens capsule.

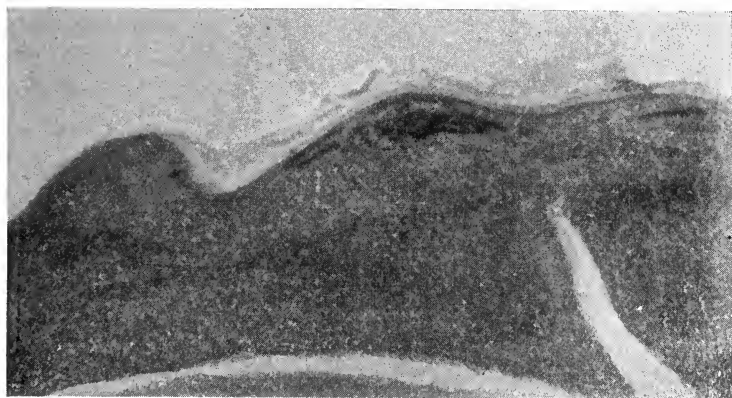


FIG. 4.

In most of the sections the lens capsule has numerous folds. Where such a fold appears near the æquator the detached epithelium runs usually parallel with it, while, where the folds lie near or at the anterior pole, the epithelial layer often appears as if torn apart. This latter condition might, perhaps, be due to a shrinking of the homogeneous substance during the hardening process, if it was, during life, of a semi-fluid consistency.

Interesting as all the lenses are, the one which showed a pyramidal cataract is, perhaps, the most interesting. In the cornea of this eye the scar of a former perforation was distinctly visible. All the sections of this lens, which do not include the pyramidal cataract, differ in no particular from those

just described. In the sections going through the small pyramidal cataract the teat-like projection of the capsule is filled with a more or less granular substance which, at the base of the cone, shows undoubted evidence of the beginning of the appearance of amorphous line. In the cone itself no epithelium lines the capsule, neither is there any epithelium visible at the base of the cone, as is often found in older cases of pyramidal cataract. But within the substance filling the cone are several convolutions of epithelial cells which take the stain but very imperfectly and are evidently disintegrating.



FIG. 5.

Like E. T. Collins, who reported 13 cases, I have had occasion to examine quite a number of lenses with pyramidal cataract, but evidently he has not, neither have I, before this seen cases in such an early, almost the initial stage.

The abnormal arrangement of the capsular epithelium in these four lenses, I am inclined to look upon as probably a congenital malformation which, other factors having been added by the perforation of the cornea, in the one lens has led to the beginning of a pyramidal cataract. In assuming this explanation to be correct, I must, of course, part with the

opinion which, with others, I hitherto held, that the lens capsule was probably formed by the capsular epithelium.

If from these few new observations I may be permitted to add a new theory to those already promulgated, in order to explain the formation of an anterior polar cataract, I would state that the prime cause probably is a congenital malformation of the lens. This malformation represents a break or breaks in the continuity of the capsular epithelium layer as well as a dissolution of contact between this layer and the lens capsule. With such a pre-existing anomaly the lens capsule would be in the same condition as Descemet's membrane after a loss of continuity in its endothelial lining; it would permit of the penetration of substances through it and into the lens in the sense of Hulke or Nuel. This penetration, in turn, might be followed by the formation of an anterior polar and pyramidal cataract.

In going further, if I am incorrect in considering the conditions described as congenital, and even where such a congenital malformation does not exist, any cause which leads to a dissolution of contact between the lens capsule and its epithelial lining, as, perhaps, a very forcible perforation of the cornea, may alter the conditions in the lens in such a manner that an anterior polar cataract may result.

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THE TREATMENT OF PROLAPSE OF THE IRIS.¹

BY F. C. HEATH, M.D., INDIANAPOLIS, IND.,

SECRETARY OF INDIANA STATE MEDICAL SOCIETY; EYE AND EAR SURGEON TO THE
DEACONESS HOSPITAL, UNION STATE HOSPITAL, CITY HOSPITAL AND
DISPENSARY, INDIANAPOLIS, IND.

PROLAPSE of the iris occurs under three conditions: First, from perforating ulcers of the cornea; second, from perforating (accidental) wounds; and, third, after such operations as the removal of cataract. The authorities are somewhat at variance as to the rules of procedure in these conditions. Formerly, it was almost the universal rule to cut off the prolapse as soon as possible, but recently, Knapp and others have advocated a more conservative course:

In the first class of cases, prolapse occurring as the result of perforating corneal ulcers, it has been found that healing takes place better by leaving the iris-mass as a sort of plug, puncturing occasionally after healing begins, if the mass protrudes much, according to the method of Noyes. Knapp has made it a rule never to cut or burn off the protruding iris in infective conjunctival or corneal disease lest the infection be let into the eyeball. He has never seen sympathetic trouble from prolapse where the iris had not been wounded by accident or by the hand of the surgeon.

On the other hand, there are many authorities that advocate cutting or burning off the projecting mass, either early (Fuchs, de Schweinitz) or after healing has taken place (Fick). As a rule, attempts to replace the iris or reduce prolapse with atropine or eserine fail.

In perforating wounds of the cornea, it is almost the universal rule to abscise the prolapse at once, unless the prolapse can be replaced and kept in place by atropine or eserine. Noyes says that successful abscission is feasible a week or even ten days after the injury, and Nettleship finds it seldom possible to return or reduce prolapse by manipulation, atropine or eserine even an hour or two after the injury. Knapp has recently shown that in prolapses of this class also a conservative

¹Read before the State Medical Society, June 2, 1899.

course may be safer and cleaner than the operative procedure, at least in certain cases. He finds that perforating wounds of the sclerotic heal kindly, but prolapse of the ciliary processes require excision—otherwise they leave cyst-like ectasia.

Of the third class, prolapse after cataract operations, Noyes says: "The treatment of prolapsed iris is not fully settled; Gayet leaves it to itself, and I have seen satisfactory results by so doing. Most operators excise it as soon as discovered; but this must be done not sooner than the fourth nor later than the twelfth day."

Knapp, however, advocates immediate excision within the first twenty-four hours after the operation, and, even in cases of incarceration of the iris without protrusion, performs iridectomy at once to prevent prolapse, excessive reaction or astigmatism after healing—thus being more radical than most operators in this class of cases, although more conservative in the other classes.

Fuchs makes it a rule to do a small iridectomy in all operations for extraction of cataract, claiming that it prevents prolapse as well as a large iridectomy, and that has proven true in the few cases in which I have tried the method.

A brief citation of some cases from my case-book will serve to show my views on this subject and some lessons may be derived from their consideration.

CASE I.—Mrs. B. Large prolapse from perforation of corneal ulcer in gonorrhœal ophthalmia. This was about ready to perforate when I first saw it. Healing took place quickly under a conservative course of treatment, but the vision was poor from the size and position of the scar. The other eye had never been affected by any sympathetic trouble when last seen, two years later.

CASE II.—Mrs. G. Small prolapse from perforating ulcer in gonorrhœal ophthalmia. Good healing under antiseptic treatment with alternate use of atropine and eserine. Scar not being central, vision was nearly normal.

CASE III.—Mr. V. Small prolapse from ulcer, healing under antiseptic treatment after paracentesis of cornea. Vision fair only, affected considerably by scar. Other eye normal four years later.

In this class of cases it will be seen that I am in full accord with the views of Knapp, above quoted.

CASE IV.—Mr. H. A scleral cut just above the upper and outer margin of the cornea. Iris protrusion cut off two days after the injury. Marked reaction followed, considerable œdema of ocular conjunctiva, intense injection of blood-vessels, floating bodies in the vitreous, etc. Although the inflammation finally yielded to treatment, with pretty good vision, I am satisfied that the result would have been as good and the patient saved considerable suffering and annoyance, had the iris protrusion been left to Nature.

CASE V.—Mr. B. Protrusion of iris from corneal cut near sclero-corneal junction. Healing took place under conservative treatment with iris adherent to scar, but vision was nearly normal.

CASE VI.—Master T. W., aged 9 years. Cornea pierced by sharp stick half way between pupil and upper corneal margin. Iris protruding and too firmly adherent to loosen without extensive operation. The family physician opposed giving a general anæsthetic as the child was just recovering from an attack of congestion of the lungs. The protruding iris was snipped off, under cocaine, with as little traction as possible. Healing took place quickly with no reaction to speak of, and practically normal vision. The slight operation in this case should be regarded as a conservative measure and was probably better than either leaving it to Nature or doing the more extensive operation necessary to fully loosen the adherent iris.

These three cases are given to illustrate the advantages of conservatism in cases of prolapse from accident, but the last one also brings out the point that we should not adhere blindly to any rule.

In prolapses of the third class, those occurring after cataract operations, my practice has been to follow a very conservative course.

CASE VII.—Miss B. Small prolapse discovered 48 hours after extraction of cataract; it increased considerably for a day or two and then remained stationary. Healing followed quickly, with slight reaction and fair vision. No atropine was used in this case. This statement is made because some operators believe the atropine often produces or increases the prolapse.

CASE VIII.—Mr. P. Operation done at Anderson, Ind.

He was seen three days later, when there was a medium-sized prolapse which had increased markedly when seen again one week later, atropine having been used. This prolapse was so large that I thought an operation would certainly be necessary, and that was the opinion of a distinguished colleague to whom I described the case. But, by his advice, the operation was deferred until all inflammatory symptoms had disappeared and by that time the epithelium had formed over the prolapse and the cicatrix contracted and flattened down with perfectly smooth healing so that operation was not necessary. This shows what Nature will sometimes do in cases that look very unpromising. Although healing was slower in this case than usual, and reaction and resulting astigmatism (from changes in corneal curvature) greater than after an uncomplicated operation; yet the final visual result, with correcting glasses, was excellent $=^{15}/_{xxx}$ for distance and finest newspaper print read easily at 10 inches. Although an early iridectomy might have brought quicker healing, less reaction and less astigmatism, it could hardly have produced better visual result and might have caused loss of the eye by infection, which sometimes happens despite the most careful aseptic and antiseptic precautions.

While these cases illustrate the possibility of good results from extreme conservatism in prolapse after cataract operations, still, when we consider with how little traumatism the iris may be cut within the first 24 hours, how slight the danger of infection when done with careful attention to asepsis and antisepsis, and how great the gain in time of healing, prevention of suffering, etc., there is strong reason to believe that Knapp's rule to immediately abscise all actual prolapses discovered by the end of the first day after the cataract extraction, is in the line of good surgery.

On the other hand, my experience leads me to reject his advice to perform iridectomy in incarceration of the iris without actual protrusion, as I have never seen, in such cases, any impairment of vision, increased reaction, or any unfavorable symptoms whatever. I have one such case in mind, in which the visual result was nearly $^{20}/_{xx}$. It would seem that the procedure, at least in such cases as I have observed, would have subjected patients to unnecessary suffering, annoyance and danger. It seems hardly necessary to detail cases in support of this position or even for illustration, as the statement above made embodies the important teaching from them all.

I desire, however, to remark in this connection that all the cases cited in the paper are for the purpose of illustration rather than to establish principles or form the basis for laying down ironclad rules, which would require not a few cases merely, but statistics embracing the experience of all competent observers.

The object of this paper is to emphasize the conservatism of Dr. Knapp regarding treatment of prolapse in cases of perforating ulcer and accidental wounds of the cornea, and to add a plea for still further conservatism, at least in cases of incarceration of the iris in the wound after cataract operations.

SYMPATHETIC OPHTHALMIA CAUSED BY GLIOMA RETINÆ.¹

BY ADOLF ALT, M.D., ST. LOUIS, MO.

SEPTEMBER 2, 1898, Leland J., 5 years old, was led into my office by his father and a medical student, from whom the following previous history of the case was had:

In the spring of 1896 ($2\frac{1}{2}$ years previous to this visit), the parents accidentally discovered that the boy's left eye was blind. They had never before noticed any inflammatory symptoms in that eye and they attributed the blindness to the fact that during the preceding summer the child had had, what they called, a "sun-stroke." About a year, after the blindness had been discovered, the eye became at times injected and painful. Finally, about a year previous to their visit to my office the eye was removed by their family physician, as they stated, to save the fellow-eye. The symptom which induced the physician to operate and the parents to consent, was a severe and uninterrupted photophobia of the right eye. In spite of the removal of the left eye, the right eye had since continually grown weaker, and had been blind for about two weeks when I saw the case.

It was impossible to get any history of injury to the left

¹Read at the Thirty-fifth Annual Meeting of the American Ophthalmological Society, New London, Conn., July 19 and 20, 1899.

eye, nor could the father give any further description of the disease which caused the destruction and removal of the left eye. Before seeing me they had just consulted an oculist, who had declared that nothing could be done for the boy, and they brought him to me to see whether I was of the same opinion.

Status præsens.—The left orbit showed nothing abnormal.

The right eye was somewhat photophobic, sufficiently so as to force the boy to turn his head down and away from the light. There was a roseate zone of injection around the corneal periphery, in the anterior layers of the cornea a slight band-shaped opacity ran from periphery to periphery in the horizontal meridian. The anterior chamber was shallow; there was some exudation in the pupillary area and a total posterior synechia of the discolored and atrophic iris. The iris periphery was pressed forward. Atropine, which had been instilled for many months, had had no effect on the condition of the pupil. The ciliary region, especially upward, was painful to slight pressure. No reflex could be obtained from the fundus, Tension was good. Vision was reduced to rather doubtful perception of light.

History and *status præsens* made the diagnosis of sympathetic ophthalmia certain.

Without holding out any definite hopes, I advised continued treatment with mercury and iodide of sodium.

This advice was complied with religiously, the mercury being given internally and by inunctions alternately.

December 6, 1898, the patient was again brought to my office. While the visible conditions of the eye had apparently but little altered, the boy could now count fingers promptly at six feet. The photophobia had disappeared, and the father, who was very happy, told me that the boy was playing about while at home, looking at large pictures, and so on. There was a little better reflex to be seen with the ophthalmoscope, but the crater-shaped pupil was still the same. Yet, besides in his vision, the boy was greatly improved in his general health and altogether the case now looked very hopeful.

I ordered the same treatment to be continued.

May 23, 1899, the boy was again brought to me. He now walked into my office alone and counted fingers at eight feet promptly. However, the child looked bad and appeared weak.

While the right eye seemed little changed, I found in the left orbit a tumor, apparently attached to the periosteum of the lower wall, elastic, round, of a slightly yellowish color and the size of a nut. A little farther back in the orbit and on the inner wall was a smaller round tumor of the same appearance. The father had detected the presence of the large tumor only a week before.

At the first glance these tumors struck me as being gliomata. The examination of the enucleated eye was now of prime importance. The father managed to procure it for me, and I promised to advise his physician of what I should find, as he would not consent to have me remove the orbital tumors. This has been done by their family physician, Dr. H. W. Latham, of Latham, Mo., who kindly sent me a part of the large tumor.

As I had suspected, the primary affection was an intraocular glioma exophytum, the walls of the eyeball being still intact at the time of the enucleation. Yet the optic nerve was gliomatous as far back as where it had been cut off. The secondary tumor removed from the orbit was also a glioma.

In his last letter the family physician wrote me that the boy was failing very fast, and comatose most of the time. Thus the end seems near at hand.

Aside from its sentimental and tragic attributes, the case is to me especially interesting first, on account of the fact, that a glioma produced sympathetic ophthalmia and, secondly, on account of the marked improvement of vision in the sympathetically affected eye, which later on might, perhaps, by surgical means, have been still further improved.

Sympathetic ophthalmia, due to an intraocular tumor has been observed before, but the cases are not very numerous. The case here related is the first of this kind in my personal experience.

The fact that a sympathetically affected eye may sometimes be improved by continued mercurial treatment is well-known also; yet, in my experience, this happy result has only occurred a few times. I think that a syphilitic diathesis which might in some cases be thought of as causing an apparent sympathetic ophthalmia as well as in explanation of the improvement under treatment, could absolutely be excluded in the case under consideration.

MEDICAL SOCIETIES.

AMERICAN OPHTHALMOLOGICAL SOCIETY.

THIRTY-FIFTH ANNUAL MEETING, HELD AT NEW LONDON,
CONNECTICUT, JULY 19 AND 20, 1899.

ABSTRACT REPORT BY H. O. REIK, M.D., BALTIMORE, MD.

The meeting was called to order by the President, DR. O.
F. WADSWORTH.

*A Description of the Reflecting Phorometer and a Discussion
of the Possibilities of Torsion in the Eyes*, by DR. F. H.
VERHOEFF, Baltimore. (Presented by invitation of the
Society).

The instrument differs from other phorometers in that mirrors are used in place of prisms, thus permitting the greatest simplicity in construction together with the most advantageous movements in the apparent images. There are four mirrors, two for each eye. By turning a milled screw, the lower mirrors may be made to rotate toward or away from each other so as to produce lateral separation of the images. It is to be noted that this arrangement produces equal though opposite movements in the two images. Vertical separation of the images is produced by rotation of one of the upper mirrors.

The parallel test of Duane has been adapted to this instrument, and a very important feature of this phorometer is a shutter which slides back and forth before the eyes so that, when in use, the patient can see with but one eye at a time. The shutter is moved back and forth very quickly, a pause being made, however, before each eye, so that time is given for the after-image to disappear, and the patient is asked to state whether the object moves or not. If he sees the object apparently moving obliquely, the upper mirror is adjusted until the movement is horizontal, and then the lower mirrors are

adjusted until practically all movement is overcome. Both the amount of hyperphoria and also esophoria or exophoria, if present, will be indicated upon the scales. It is thus possible, by means of the reflecting phorometer, to determine the amount of heterophoria either by the diplopia test or by the shutter test, and, in addition, the amount of abduction, adduction and right or left sursumduction may be readily obtained.

By means of a special chart, consisting of two rotary discs placed one above the other, the instrument may be used to determine and measure any possible torsional deviation in the eyes. It was shown that by means of the instrument an artificial torsion could be produced in the retinal image of any object regarded. In this way it was determined that the eyes can bear, without discomfort, a tilting of the retinal images in in the two eyes equivalent to a torsion of 8° .

Four experiments were described to prove that torsional combining power or an ability to so rotate as to overcome artificially produced declinations and cyclophoria, do not exist. Since the fusion of lines situated upon non-corresponding points of the retinae is not due to torsion of the eyes, it was spoken of as being due to psychical compensation.

DR. VERHOEFF believes that the existence of a torsional combining power has been assumed by Stevens without sufficient evidence, and that Savage has fallen into error in assuming the existence of cyclophoria.

Congenital Inefficient External Rectus and Binocular Vision,
by DR. J. O. TANSLEY, New York,

The patient was a strong, healthy young man. Asking him to look at and follow a pencil it was seen that the left eye had perfect motility but that the right eye, although it had perfect movement upward, downward and nasally, could not be moved quite to the median line outwardly. He had binocular single vision in any part of the left field, but a pencil held directly in front of him appeared double, and the farther it was moved to the right the greater was the diplopia. The diagnosis was congenital absence or atrophy of the right internal rectus. A tenotomy was performed upon the right internal rectus in the hope of overcoming the necessity of turning the head to the right, but the conditions were not much improved.

A second case was reported in which the patient always turned his head to the left or eyes to the right when doing close work. Examination showed that he could not rotate the left eye outward quite to the median line. All other movements were normal. The condition here also seemed to be congenital atrophy or absence of the external rectus.

A Case of Primary Tumor of the Optic Nerve, by DR. F. BULLER, Montreal, Canada.

The patient was a boy, 6 years of age, in good health, save for some slight nervous disturbances. The right eye presented a high degree of proptosis, and the exposure caused constant irritability of the eye. The ophthalmoscope showed the optic nerve entrance apparently much larger than normal, of a pale bluish white tint with oval outline and irregular margins. Palpation revealed within the orbit a large, somewhat elastic mass without distinct outline. These symptoms, together with the complete blindness, pointed to the presence of a tumor involving, if not originating in, the optic nerve. Removal was attempted by severing and drawing aside the internal rectus, but it became necessary to enucleate the eye with the tumor mass which surrounded the optic nerve. The patient made a good recovery and one month later was reported to be in good health and quite free from nervous attacks.

A pathological study of the tumor showed that it belonged to that class usually described as myxo-sarcomatous, but the changes in the optic nerve, at least, are to be looked upon as due to a chronic distension of the lymph spaces, and it is suggested that possibly the whole condition was due to some localized disturbance of the lymphatic system.

DISCUSSION.

DR. REEVES said that he had seen last summer an interesting specimen in the Birmingham Ophthalmic Hospital of a tumor of the optic nerve from a patient who had excellent, if not normal vision.

DR. BULLER stated that this was the third case he had seen, and he had considered the loss of vision with complete optic atrophy one of the diagnostic features of optic nerve tumors.

A Case of Primary Non-pigmented Sarcoma of the Left Upper Lid, by DR. C. A. VEASEY, Philadelphia.

The patient was a Polish tailor, 45 years of age, who had observed a small growth on his eyelid four months previous to his visit. It resembled a chalazion in many respects and was adherent to the overlying skin but moveable over the tarsus. It was dissected out and the microscopical examination showed it to be an encapsulated non-pigmented spindle-celled sarcoma. A review of the literature discloses the records of only about 50 cases of sarcoma of the lid, 38 per cent. of which were spindle-celled, 38 per cent. round-celled and 24 per cent. mixed.

An Instrument Intended to Facilitate the Operation of Capsulotomy, by DR. F. BULLER, Montreal, Canada.

The instrument consists of two needles exactly parallel with each other, not more than 0.25 mm. in diameter and exquisitely sharp. It is to be used in the following manner: First, the pupil is dilated, if possible with atropine, then a careful inspection is made by focal illumination to find the weakest and the strongest parts of the capsule to be divided, bearing in mind that the aperture to be made must be as nearly as possible, central. The double needle is passed through the cornea at any convenient point to the central edge of the denser portion of the capsule and the Knapp needle-knife passed through the sclero-corneal junction to the line of its incision through the thinnest part. This incision being completed, the cutting needle is then passed between the limbs of the double needle and made to cut the denser capsule by one sweep. The double needle is to be withdrawn first, and then the cutting needle.

The advantages claimed are a large, clear central aperture, without traction on the zonule, and very slight reaction.

DISCUSSION.

DR. STANDISH said that he had tried some years ago to use a double needle in this way, but had found considerable difficulty to cut the capsule without pushing it before the instrument, and he had abandoned the method. He thought it difficult to make equal pressure with the two limbs of the needle, and, therefore, one frequently entered while the other did not.

DR. BULLER stated that he did not attempt to cut the capsule with the points of the needle but merely exerted enough pressure to steady the capsule.

Case of Expulsive Intraocular Hæmorrhage After Preliminary Iridectomy for Cataract, by R. L. RANDOLPH, Baltimore.

The accident occurred on the third day after an iridectomy preliminary to cataract extraction. The patient was 76 years of age, in good health, and had a mature cataract in the right eye and commencing opacities in the left. Iridectomy was performed with perfect satisfaction and for two days the patient did well. On the third day she suffered a great deal of pain, and on inspection it was found that the corneal wound was bulging, the anterior chamber was obliterated, the lens was pushed forward and the iris was resting against the posterior surface of the cornea. On the following day it became necessary to extract the lens, since the condition was steadily becoming worse, and no sooner was the section completed than the lens was ejected with great force and a mass of vitreous immediately followed. The corneal flap was replaced and a shrunken eyeball resulted.

In the course of six months glaucoma of the left eye set in and in spite of treatment advanced rapidly to blindness. It was not thought wise to attempt an iridectomy in view of the experience with the right eye, but the pain became so intense that paracentesis of the vitreous was performed twice, and although the eye remained hard, the pain entirely disappeared.

The development of the glaucomatous condition of the left eye seems to justify the conclusion that the same condition was present, in a milder stage, in the right eye at the time of operation.

DISCUSSION.

DR. FRYER said he had met with several cases of hæmorrhage after cataract extraction, and he thought it interesting to note in this case that the very slight change of pressure following an iridectomy could produce a hæmorrhage in these cases that are so predisposed.

DR. SUTPHEN reported a case of hæmorrhagic glaucoma in which he had undertaken to make an iridectomy but had a

profuse hæmorrhage, with loss of vitreous, and final destruction of the eye.

DR. CARMALT asked if any examination of the kidneys and of the arterial system had been made in these cases.

DRS. RANDOLPH and FRYER both replied that they had made urinary analyses without finding albumen.

DR. MILLIKEN reported a case of hæmorrhage occurring on the sixth day after extraction, without serious results; the hæmorrhage gradually clearing up.

DR. REEVE referred to a case in which he had operated upon the eye successfully by first doing a paracentesis, then an iridectomy and, finally, extraction, with good results.

DR. WADSWORTH reported a case of profuse hæmorrhage after iridectomy, which compelled him to abandon his operation. The wound healed perfectly, however, the hæmorrhage cleared up and extraction was done later.

Retinitis Albuminurica as a Factor in the Causation of Secondary Glaucoma, by DR. C. S. BULL, New York.

The connection between retinal hæmorrhage and secondary glaucoma is recognized by all, but the connection between retinitis albuminurica and secondary glaucoma does not seem to be so clearly recognized. The connecting link is probably more or less extensive disease of the walls of the blood-vessels, which may be regarded as a common cause of both the retinitis and the hæmorrhages. It is generally conceded that interstitial nephritis is the variety usually accompanied by retinal hæmorrhages, and in this form of nephritis the general constitutional symptoms vary greatly in different cases. Albuminuria, the most certain sign, is occasionally absent, and when present, is slight in amount and not easily detected. Two symptoms, however, are rarely absent, and these are cardiac hypertrophy, with a doubling of the first sound and certain cerebral phenomena. The most frequent head symptom is a continuous frontal or occipital headache. When these symptoms are found the urine should be subjected to frequent analysis.

In looking over the literature of hæmorrhagic glaucoma I find that many of the published cases were marked by these symptoms. In almost all the cases of secondary glaucoma, preceded or accompanied by retinal hæmorrhage and exuda-

tion, it is quite impossible to decide whether the glaucoma is really secondary to the hæmorrhage or whether the two are simply associated together.

DR. BULL then reported in detail four cases of acute glaucoma following exudative retinitis albuminurica.

DISCUSSION.

DR. PROUT suggested that possibly we could gain some knowledge of the cause of glaucoma if we could follow up a number of cases and see what the patients eventually die of.

DR. WADSWORTH reported one case of secondary glaucoma in both eyes in which he had been able to follow the patient's history until she died, of acute pneumonia, but at no previous time had she been the subject of any discoverable disease.

DR. HOWE brought up the question of heredity as a factor in the causation of glaucoma, and reported one family with eight cases of secondary glaucoma in three generations.

DR. MITTENDORF said, concerning heredity, that the Hebrew population is extremely prone to this disease.

On Anomalies in the Epithelial Layer of the Crystalline Lens and Anterior Polar Cataract, by DR. ADOLF ALT, St. Louis. (See page 225, this issue).

DR. ALT reviewed the various theories concerning the origin of anterior polar cataract and said: It seems to me that contact between the anterior lens capsule and the posterior surface of the cornea, whether this membrane be otherwise healthy or infiltrated with pus, even if it be prolonged, can not alone be the cause of the formation of an anterior polar cataract. If it was, it should occur at least now and then after a perforating injury of the cornea and with more frequency after ulcerative perforation of this membrane.

He was not inclined either to accept the theory of intra-uterine corneal perforation as an explanation of the congenital cases, in view of the fact that heredity seems to play such an important part in their history. As a result of his examinations of a number of eyes he is inclined to believe that the prime cause of the formation of an anterior polar cataract is some congenital malformation of the lens, and that this represents a break in the continuity of the capsular epithelium layer

as well as a dissolution of contact between this layer and the lens capsule. With such a pre-existing anomaly the lens capsule would be in the same condition as Decemet's membrane after a loss of continuity in its endothelial lining, and this would permit of the penetration of substances into the lens, which might be followed by the formation of cataract.

A Method of Converting the Alternating Current for Use in Connection with the Johnson Magnet, by DR. W. B. JOHNSON, Patterson, N. J.

The portable electro-magnet devised by the author and described in the May number of *Knapp's Archives*, is only of use in connection with a direct electric current of 110 or 120 volts, and consumes $\frac{1}{2}$ -ampere of current. Municipal lighting in many cities is accomplished entirely by the alternating current, and as some means of converting this into a direct current is essential to the adoption of this or any other magnet for general use, the following method is suggested:

A $\frac{1}{4}$ -horse-power fan motor, adapted to the alternating current, is fitted with a pulley, belted at a distance of 3 feet to a pulley attached to a $\frac{1}{6}$ -horse-power fan motor, wound for the direct Edison current; the speed of the motors must be the same. The Edison motor acts as a generator and furnishes the $\frac{1}{2}$ -ampere of current at 110 volts necessary to fully saturate the core of the magnet. The probable cost of such an appliance would be about \$50.

The Johnson magnet was exhibited and is offered as a substitute for the Haab magnet, being less cumbersome, equally as strong, portable and more easily adapted to use in cities having alternating currents, as it requires only $\frac{1}{2}$ -ampere of current, while the Haab requires 10 or 12, and needs a motor and generator of several horse-power.

Report of Three Cases of Magnetic Extraction of Steel from the Eyeball Through the Point of Entrance, by DR. W. B. JOHNSON, Patterson, N. J.

In all three cases large pieces of metal were removed from the eye without difficulty by the Johnson magnet. In every instance considerable pain was produced as the magnet first approached the eye, and in the second case the wound of entrance, having become partially closed, had to be enlarged.

The largest piece of metal was $\frac{3}{8}$ of inch long by $\frac{1}{8}$ of an inch in width.

DISCUSSION.

DR. HOWE said that he had had some difficulty with other magnets in that when the foreign body was drawn up to the wound it was scraped off as the magnet was withdrawn.

DR. HOLT said that he had been able to overcome that difficulty by having an assistant open the edges of the wound with a small Stevens' strabismus hook.

DR. JOHNSON suggested the advisability of enlarging the wound of entrance before attempting to remove the bit of metal from the vitreous.

DR. HARLAN spoke of the necessity for attempting the removal as soon as possible after the injury and before the foreign body can be bound down by exudative material.

A Cyst of the Vitreous (with patient), by J. O. TANSLEY, New York.

On ophthalmoscopic examination a floating spheroidal body about the diameter of the optic disc could be seen in the center of the vitreous chamber. When the eye was quiet it slowly settled to the lower part of the cavity and remained there in contact with the retina, but the slightest movement of the eyeball caused it to move rapidly about. The cyst had a distinct capsule which was pigmented in spots, and the spots on the posterior capsule could be seen through the transparent anterior capsule and cyst contents. It was apparently benign.

DISCUSSION.

DR. ALT suggested that it might be one of the adomatous tumors of the ciliary process, described by him which, having undergone cystic degeneration, had become detached.

DR. RANDALL thought it more likely a detached cyst, as are occasionally seen at the edges of a coloboma, and which had been set adrift by a process of closure of the congenital cleft.

A Case of Sympathetic Ophthalmia Due to Glioma Retinæ in the Fellow Eye, by DR. ADOLF ALT, St. Louis. (See page 238, this issue).

This patient, a boy of 5 years, had one year previously

had the left eye removed because it was blind and was the source of irritation to the right eye. When seen by Dr. Alt, there was well-marked sympathetic ophthalmia, with blindness in the right eye. After treatment with mercurials and iodides a marked improvement took place in the eye so that the boy was able to count fingers at eight feet, but his general condition did not improve, and in a few months two small growths appeared in the left orbit. The enucleated globe was obtained, and an examination of it, as well as pieces of the new growth, showed gliomatous tissue. Cases of sympathetic ophthalmia, due to intraocular growths, are rather uncommon.

Cases of Metastatic Panophthalmitis, by DR. B. L. MILLIKIN, Cleveland, Ohio.

Case 1 was one of typhoid fever with monocular iridochorioiditis and severe earache and headache. Although there was no autopsy it seems likely that the panophthalmitis in this case was caused by extension from some meningeal involvement.

In case 2 there was monocular panophthalmitis, probably due to septic endocarditis, although the systemic diagnosis was not certain.

In case 3 there was binocular panophthalmitis in connection with a fatal pneumonia. In the second and third cases it is probable that the eye disease was embolic in character.

DISCUSSION.

DR. FRYER said that these metastatic cases would seem to be due to some peculiar forms of sepsis. During the Civil War he had seen a large number of cases of pyæmia, but remembered only one case in which there was metastatic trouble within the eyeball.

DR. RANDOLPH referred to a case which he reported three years ago of panophthalmitis occurring in a child, 9 months of age, and in whom it was impossible to determine the cause for the disease. The only disease the child could have had was possibly la grippe.

A Case of Spontaneous Rupture of the Eyeball, by DR. B. L. MILLIKIN, Cleveland, Ohio.

The patient, a woman, aged 68 years, had for a number of years complained of neuralgic attacks in the head. In Janu-

ary, 1896, she had an acute attack of pain in the left eye and within a week a similar attack in the right. There was rapid loss of vision, and since then she has been blind. The tension in both eyes was +3.

On January 4, 1898, while sitting quietly in her own room she had an acute attack of pain in one eye, followed immediately by spontaneous rupture of the globe and profuse hæmorrhage. The rupture was a nearly vertical one through the center of the cornea from the lower margin of the pupil upward into the sclera.

AFTERNOON SESSION.

Multiple Rupture of Sphincter of the Iris with Subsequent Development of Myopic Astigmatism, by DR. W. F. MITTENDORF, New York.

In this case there were six distinct ruptures of the pupillary border, and no unusual dilatation of the pupil except at the seat of the ruptures. After the injury had healed a myopic astigmatism of 3D. was observed, with the axis of the cylinder in the direction of the most pronounced rupture. The eye was apparently normal before the injury and the ophthalmometer showed a normal cornea afterward, so that the astigmatism must have been lenticular.

Normal Pupillary Reaction, with the Microscope for Its Measurement, by DR. LUCIEN HOWE, Buffalo, N. Y.

In regard to the measurements in pupillotomy, those made with the naked eye are entirely unreliable. The ophthalmometer requires too bright a light, and the best form of instrument is that in which the scale is fixed in the tube of a microscope or of a telescope. The instrument here presented, made by De Zeng, gives us a great amplification, with a flat field, and the slightest variation in the size of the pupil can easily be detected and measured. This instrument had already been described by the writer as a microscope for viewing the eye.

The Value of Acoin as a Local Anæsthetic in Eye Surgery, by DR. R. L. RANDOLPH, Baltimore.

In January, 1899, Trolldenier, of Dresden, published a report of experiments upon rabbits with a new anæsthetic,

namely, acoin, using it both in powdered form and in solutions of varying strengths. Dr. Randolph has tried this preparation in solutions of 1 to 100 and 1 to 300 upon the human eye and finds in many respects it is not as satisfactory as either cocaine or holocaine. For instance, if the eye be congested or irritated, repeated instillations even will not give satisfactory anæsthesia; it produces rather more stinging than the other anæsthetics named and is not so rapid in action. It does not affect the accomodation, and a few experiments made seem to indicate that organisms can not live in a solution of it.

DISCUSSION.

DR. HOWE objected to the inaccurate methods of expression we are drifting into concerning the effect of local anæsthesia, and called attention to an article published by him some years ago in the *Archives*, explaining a method by which we can obtain a numerical expression of local anæsthesia by means of electricity.

More Uniform Tests for Vision, Color-Sense and Hearing, by DR. C. H. WILLIAMS, Boston.

In re-arranging the tests for one of the New England railroads, Dr. Williams found it necessary to have a new set of letters carefully drawn, so that the height of each letter should subtend the standard visual angle of five minutes, and the width of a component parts an angle of one minute, as shown by Prof. Snellen to be the angle at which letters should be easily read by the normal eye. In order that these cards should be in a portable shape, the letters were printed on cards $3\frac{1}{2}$ by 9 inches, which can be readily placed in an envelope that will go into the coat pocket. One line of letters only was printed on each card, and a different arrangement of letters for each of the required distances of 20, 30 or more feet; was adopted for each card in order to prevent memorizing. Another feature of these cards is the addition of three cards on which are printed representations of the ordinary semaphore arm signals, the length and the width of the arms being the same as the height and width of the letters on the 20-foot card, and when seen at a distance of 20 feet they correspond in size to the apparent size of a standard semaphore arm, 46 inches long and 7 inches wide, when seen at a distance of a $\frac{1}{2}$ -mile.

There is need of greater uniformity in the tests used for the color-sense, and it is stated as a general proposition that no test for color-perception is satisfactory unless it concludes first a test by comparison of colors, the Holmgren worsted test being, perhaps, the best; and, second, a test with colored lights, in which the intensity of the lights can be varied, and in which the names of the colors shown should be given by the person examined.

DR. WILLIAMS then exhibited a lantern which he had devised for making this test with colored lights, and to show the danger of relying on one test, reported some cases which had passed the confusion color-tests with worsted but failed with the lantern-test. With the lantern it is possible to detect a very small central color defect which would not be noticed when testing with the worsteds, because their image would cover a larger area than that affected, and hence; would be recognized.

In order to have a more uniform test for hearing, a ratchet acoumeter has been devised which produces a series of sharp metallic sounds by turning the milled head.

In regard to the use of spectacles by train, engine or yard men, there can be no objection to their use for reading train orders, etc., but for distant vision, for the proper reading of signals which may be rapidly approaching, and under all the the varying conditions of the weather, such as fog, rain and snow, it will be found that when the need of assistance from the glass is the greatest, they will often be a hindrance rather than a help; the moisture condensing on the glass will obscure the vision, and the tendency will be to remove them and depend upon unaided sight.

Although it may be a hardship in some cases, it will be safer to require for the re-examination of men in the service a vision of not less than $\frac{20}{xxx}$, with both eyes open, without glasses, for enginemen and firemen, and a vision of not less than $\frac{20}{xl}$ under the same conditions for others engaged in operating trains.

A Modified Perimeter, by DR. C. H. WILLIAMS, Boston.

This consists of the ordinary self-registering perimeter with electrical attachments, small incandescent lights being used both for fixation and for the movable point on the arc.

PROCEEDINGS OF THE OPHTHALMOLOGICAL
SOCIETY OF THE UNITED KINGDOM.

FRIDAY, JUNE 9, 1899.

H. R. SWANZY, F.R.C.S.I., President, in the Chair.

SPECIAL MEETING.

THE OPERATIVE TREATMENT OF MYOPIA.

A discussion on this subject was opened by Mr. F. Richardson Cross. He said that in the higher degrees of myopia they had to deal with a serious defect of vision which might not be of great importance to the educated, or to those engaged in fine work, but which to the ordinary laborer or handicraftsman might mean unfitness to earn a living by reason of the limit in his range of vision. Patients with high myopia, besides suffering in various ways from pain and discomfort, might be subject to increase in the myopia and a continued deterioration of the tissues of the eyeball from stretching or tearing of the choroid, inflammation or hæmorrhage in the eye, and from detachment of the retina. Moreover, with full optical correction of the myopia the visual acuity was more or less diminished, and also the glasses which gave full correction could not be often worn with satisfaction. After a historical review of the subject the author went on to speak of the operation as now practiced, and referred to the communication of Fukala to whom the credit of establishing the present operation was due. Fukala claimed the following advantages for the operation: It gives distinctness of vision for distance, and improves visual acuity. It enables patients to work at the distance of ordinary useful sight without glasses, or with glasses easily borne, and improves the position of the head and body. It enlarges the retinal images, and allows of more light falling on the retina. It simplifies the optical apparatus of the eye. It removes the strain of accommodation and lessens the tendency to further increase in myopia. It improves the condition of the tissues of the eye.

Proceeding to methods, Mr. Richardson Cross said that

the removal of the lens was the only operative procedure likely to be of use, and the way of removing the lens was by discission and subsequent evacuation of the lens in the young, in whom the operation was most frequently necessary. In older patients, or where the condition of the eye was unsatisfactory, iridectomy followed by discission before extraction would be preferable. Some authors advocated repeated small discissions without evacuation, others practiced very free cutting up of the lens and capsule. Mr. Cross thought discission should be limited to the anterior portion of the capsule, as a rule, to avoid deep swelling of the lens within its capsule; evacuation of the swollen lens-matter by the curette should be done within a few days before tension of the eye came on. He had used the suction syringe for removing the lens débris in some cases. Well-marked disease of the vitreous, or tendency to intraocular hæmorrhage, or softening of the globe, or some kinds of impairment in the visual fields were contra-indications of the operation. Choroiditis or macular changes, unless hæmorrhagic, were not against the operation. Certain incidents were unfavorable, as prolapse of the vitreous after laceration of the posterior capsule; septic infection was likely to occur after prolapse of the iris; the puncture of the anterior chamber should be small and peripheral to avoid this. Detachment of the retina as a consequence of the operation probably was less frequent than had been thought; but still detachment of the retina, judging from statistics, was rather more likely to occur after operation in myopia than in eyes which had not been touched.

The results of operation in 48 cases were appended, and the author stated that he did not regret interference in a single case. The greatest amount of myopia was 25 D. and the lowest 7 D.; the latter were very young patients in whom the myopia was progressive. As a rule, we should not operate where the myopia was less than 15 D. He always operated on the worse eye, and, as a rule, on one eye only, the best eye being left untouched for reading purposes, while the operated eye was used for distant vision. The evidence of the sufferers from myopia who had been operated on had been, almost without exception, favorable to the operation, and they were conscious of the advantage they had gained.

MR. HARTRIDGE thought, that judging by the sections of

the ciliary muscle in myopia, the amount of accommodation in such eyes was less than in normal sighted eyes. The vitreous in myopes of over 15D. was rarely healthy, so that diseased vitreous he did not regard as unfavorable. He had operated on 17 eyes in patients whose ages ranged between 8 and 30. He practiced free needling of the anterior capsule followed by linear extraction; in one case detachment of the retina had come on 6 months after the operation.

MR. LANG had had 30 cases. In one case detachment of the retina came on after operation, but inasmuch as the same thing happened in the other untouched eye 3 months later, he did not think it important. In the last few years all needle insertions had been made through the sclero-corneal margin to avoid suppuration. He used atropine after the needling.

MR. TREACHER COLLINS had operated on 11 eyes. In one case the lens had become entirely absorbed after one needling only; the sight had not been made worse in any patient; it had been improved in all except one case in which there was central choroidal atrophy. All his patients had been entirely satisfied.

MR. CARGILL had operated in 6 cases.

MR. ADAMS FROST had done the operation on 24 eyes, the value of the operation lay in the fact that the higher the myopia the greater the reduction in it produced by operation. The questions he proposed before doing an operation in any case were: Did circumstances make the wearing of glasses undesirable? Was the vision likely to be good after operation without glasses? Would the patient be better off after operation when using glasses? The fewer operations the less the risk in any case. He used the sclero-corneal puncture in needling. As a rule, he thought both eyes should not be operated on.

MR. RAYNER BATTEN had operated on 13 eyes. He asked why the operation arrested the myopia? In one case in which the lens had cleared up rapidly after operation, he had noticed an increase in hypermetropia going on steadily for some months, he explained this by a definite shrinking of the eye going on steadily, but generally unnoticed, because of the opaque condition of the lens.

Messrs. Wray, Breuer, Critchett, Jessop, Stephenson, Lawford and Doyle also spoke.—*British Medical Journal*.

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ORIGINAL ARTICLES.

A CASE OF SPINDLE-CELL SARCOMA OF THE
ORBIT.

BY HENRY DICKSON BRUNS, M.D., NEW ORLEANS, LA.,

AND

BY ADOLF ALT, M.D., ST. LOUIS, MO.

THE following history accompanied a specimen consisting of the upper lid, orbital tissue, and eyeball kindly sent me for examination about fourteen months ago by Dr. Henry Dickson Bruns, of New Orleans, La.:

On July 25, 1898, E. M., a white boy, 4 years of age, was brought to the Eye Department of the Eye, Ear, Nose, and Throat Hospital at New Orleans, La.

The history given was that two months previously a swelling like a styne had been noticed growing on the edge of the right upper lid. The boy was perfectly healthy and well-nourished. On examination a tumor of the size of a walnut was found situated in the right upper lid causing great swelling and giving the lid a red and angry look. Below the lid the chemotic conjunctiva protruded to a considerable extent.

Considering it possible that this was an abscess of the lid and at the same time in order to gain some knowledge of the nature of the swelling—if it was not an abscess, a deep incision was made into the tumor on July 27. This incision was made through the skin of the lid and carried quite deep. Having penetrated the skin the knife plunged into a soft, freely-bleeding mass. No pus was found. The diagnosis of a malignant

tumor was now made and the extirpation of all the tissues concerned was advised.

Three days later, on July 30, the mass was found to increase rapidly in size.

On July 31, the operation was performed under chloroform anæsthesia. It consisted of the removal of the whole upper lid well up to the eyebrow and enucleation of the eyeball, followed by thorough evisceration of the orbital tissues. The cavity was then packed with iodoform gauze.

August 2. Patient had rested well during the night. The highest temperature had been 99.4° F. Patient was beginning to eat heartily.

August 6. The dressing was changed and no sign of suppuration was found. The patient was now discharged from the ward.

After this he came daily to the clinic and the orbit was dressed with iodoform. Healing progressed rapidly.

A few months later Dr. Bruns wrote me not yet to report the case, as a relapse had set in.

On July 12, 1899, Dr. Bruns again wrote me that the patient had died on April 15, 1899, from exhaustion after recurrence of the tumor. He further said, that the point of greatest interest in this case to him had been the extremely robust appearance of the child weeks after recrudescence.

Macroscopically, the hardened tissue of the orbit and upper lid formed a uniformly whitish-yellow mass of firm consistency. There was a barely recognizable sulcus below the lid margin, due to the pushing outward of the whole palpebral conjunctiva of the upper lid together with the bulbar conjunctiva of the upper half of the eyeball.

The only pathological condition the eyeball presented macroscopically was a partially dim lens.

In order to examine the specimen more conveniently I removed the eyeball from the adherent orbital tissue and lid.

The tissue of the tumor proved to consist of densely packed small spindle cells, the arrangement of which corresponded with that of other similar tumors. No intercellular tissue could be found, yet bands of connective tissue, remnants of the normal orbital tissue, separated the spindle cells in many places and directions, thus giving the tumor here and there an alveo-

lar appearance. The tumor throughout contains a great many blood vessels. Most of these had distinct walls, but there was also quite a number of blood channels which appeared to be without walls.

The surface of the tumor is covered by the lid and conjunctiva. In longitudinal sections the upper lid is represented by a narrow band of tissue in which are found the different elements of the normal lid compressed together and partly atrophied. The Meibomian glands have disappeared, except near the lid margin where glands and eyelashes seem to be about normal. All of this tissue is infiltrated with round cells.



At the lid margin the conjunctiva, as has been stated, is pressed forward by the tumor tissue to such an extent that the conjunctival fornix is in the same line with the remainder of the conjunctival tissue, convex instead of concave. The conjunctival surface is very uneven on account of numerous and high inflammatory papillæ. The outer layers of epithelium have been shed and long cylinders and spindle-shaped epithelial

cells, except near the lid margin, form the only covering. From the exposure to dirt and coal-dust, these epithelial cells contain minute particles of anorganic pigments giving the layer a grayish-brown appearance. The tissue lying beneath the epithelium consists of compressed strands of connective tissue which are densely infiltrated with round cells. Here and there the site of a former gland of Krause or an adventitious lachrymal gland can be suspected from the peculiar gland-like arrangement of the round cells.

In spite of the enormous stretching, there is a well-defined and unbroken line between the lid and conjunctiva on the one and the tumor tissue on the other hand. This line was as yet nowhere broken through in the whole series of sections which I made.

Contrary to this condition in front, where the soft and elastic tissues were the only opponents to the growth of the tumor, hardly any but tumor tissue is found backwards in the orbit, the orbital tissue having given way altogether to the invader. There is not a trace of fat tissue. The only exception to this rule is made by the tissue of the extrinsic muscles of the eye after they have pierced Tenon's capsule, as this latter together with the eyeball had as yet offered a successful resistance to the growth of the tumor.

The optic nerve is partially atrophic and œdematous. The same condition is visible in the optic papilla which shows unmistakable signs of a former neuritis optica which has passed over into atrophy with disappearance of nerve-fibers, the place of which was taken up by the œdematous fluid.

In consequence of this œdematous swelling, the fibers of the lamina cribrosa represent an arrangement as I have seen in a few cases only. In the longitudinal section a part of them forms an arch forward toward the interior of the eyeball, while a larger portion forms a similar arch backward, as we see it in glaucoma. Thus, a lens-shaped space appears between these two arcs in which there are hardly any fibers appertaining to the lamina cribrosa. This, I think, shows that the œdematous condition came on at a later period than the atrophy of the nerve-fibers.

The pia mater sheath of the optic nerve is densely infiltrated with round cells, but no tumor-cells have entered the intervaginal space as yet.

The blood-vessels of the retina, choroid, ciliary body and iris are all empty, and these tissues are œdematous throughout.

The crystalline lens shows beginning degeneration of lens-fibers, and the peculiar œdema-like changes in the capsular epithelium-cells, which I have described *in extenso*, in the February, 1899, number of this Journal.

The portion of bulbar conjunctiva which was attached to the lower half of the eyeball showed innumerable cells undergoing a mucoid degeneration—so-called goblet-cells.

HISTORICAL SKETCHES.

BY C. M. HOBBY, M.D., IOWA CITY, IOWA.

COUCHING FOR CATARACT.

CONCERNING this method of treating senile cataract, which is the favorite operation of the novelist, and perhaps of the surgeon who remembers his delight in the stories of Charles Reade better than he does his teaching concerning ocular surgery, De Wenzel, in his "*Manuel de L'Oculiste*," (Paris, 1808) says:

"La dépression de la cataracts est une opération qui a été pratiquée de toute antiquité, jusqu'au milieu à peu près du siècle dernier, et qui maintenant est tombée, pour ainsi dire, et à juste titre, en désuétude. Cette méthode de guérir la maladie connue sous le nom de cataracte, a été remplacée par celle qui consiste à extraire le cristallin altéré."

Nevertheless, the text-books continued to describe this operation as an allowable one, past the middle of this century, and from my observation, as given herewith, it will not have passed into "innocuous desuetude" at the end.

The whole history of the substitution of extraction for reclination is interesting, but no more terse presentation of the objections to couching can ever be given than is found in De Wenzel, written more than ninety years ago. He says

there are innumerable objections, the most important of which are (I translate and abridge):

1. Pain sharper and stronger than after extraction; frequent vomiting often leading to violent ophthalmia followed by abscess of the cornea.

2. Separation of the retina and choroid, the lens acting as a foreign body and producing atrocious pain that only ends with life.

3. Hæmorrhages into all parts of the eye.

4. Operation limited to hard cataracts.

Yet, nearly seventy years later, Haynes Walton, in his very practical text-book (third edition, 1875), says: "Although displacement is a very inferior operation to extraction, it should not be condemned or made obsolete. More success may be obtained from it in the hands of unskillful and inexperienced operators than from any form of extraction, because it is an easier operation and there is very much less risk of accidents during its performance. I have seen good results obtained by men who would probably never get success by extraction."

In the early seventies there was a general surgeon in Iowa of deservedly high reputation, who couched a great many cataracts; and I enucleated two eyes upon which this operation had been made, on account of excessive pain and irritability, each as a preliminary to extraction of cataract in the remaining eye. I made a reclinacion in one case in 1877—a very feeble man 94 years of age, with atheromatous arteries, upon whom I feared the effect of ether, and the very fair vision obtained lasted him until the termination of his life several months later. Since then, until this last half of the last year of the century, I have seen no instance of reclinacion nor heard of any operator who still used it.

This was a case in which a man of 69 years had been operated on some weeks previously by what to appearances was the old operation of depression rather than reclinacion. He said the operation had been repeated several times. The pupil was clear; the iris responding very feebly to a mydriatic; the lens well placed below and apparently only slightly movable, and the vision with +10.00 D. $\frac{20}{60}$, not capable of improvement. No reason was appreciable why the vision should not have been as good as after an extraction. That is, the cornea, vitreous, and fundus were apparently normal.

PTERYGIUM AND BURNS OF THE EYE.

The persistence with which obsolete methods are perpetuated in literature is doubly illustrated in the second volume of "Sajous' Annual and Analytical Cyclopedia of Practical Medicine" in the elaborate article upon "Diseases of the Conjunctiva." I will leave to someone else the criticism of that part concerning "Granular Conjunctiva," and the old story of "Egyptian Ophthalmia," simply protesting against one passage.

"It prevails in the Western prairies, and is found scattered widely over the country."

But, under the title Pterygium, none of the observations as to causation or treatment, made in the last quarter of a century, is mentioned. I suppose a great many besides myself, influenced by the clear technique and the beautiful picture of Wells, of operation by ligation, have employed that method once, but has anyone repeated it? Yet, under treatment, the author gives "excision and ligature," and if the growth be very large, splitting and transplantation above and below, not a word about the conjunctiva. Nothing is mentioned of transplantation, of removal and sliding the conjunctiva down so as to bring the cicatrix under the lower lid; of Hotz's plan of loosening the conjunctival attachment; or of the advantage of separation from the cornea by evulsion instead of cutting.

He says it is "especially common among persons who are submitted to the inclemencies of the weather; sailors, coachmen, farmers, and others," which is pure hypothetical closet etiology. For sailors are *not* subject to pterygium, and farmers are in some places and not in others, and less so in inclement countries than in some not subject to discomforts of the weather.

Again, the treatment of burns by lime, acids, hot water, etc., does not represent modern usage, and is not such as can be thoroughly or practically approved.

The author says: "If the substance inflicting the burn is lime, the eye should be washed with a diluted or weak solution of a mineral acid, or if this is not at hand, all particles should be removed by forcibly flooding the eye with water from a hose or spigot. If an acid has caused the burn, it should be neutralized by a weak solution of borax, bicarbonate of soda, or of common salt if nothing else be at hand."

I submit that this is also closet or theoretical therapeutics, based on "alkalies are neutralized by acids, acids by alkalies." But unslaked or slaked lime in the eye, adherent to the conjunctiva, it is impossible to detach with water. No eye could stand the stream of water capable of removing lime, and water will only increase the slough. Sulphuric acid burns where it touches; flood the eye with water, or "a weak solution of alkali," and the entire conjunctiva is burned and symblepharon results. It has been known from time immemorial that oils and fats promptly limited the caustic effect of lime in the eye, and in addition they greatly facilitate the removal of the adherent particles. While vaseline may be preferred, any bland oil or animal fat, melting at the temperature of the body, will immediately arrest the caustic effect of lime. And this is also true of the action of mineral acids; if the eye can be washed out with oil before the acid is diluted with the tears the eschar will only involve the epithelial surface; if the acid becomes diluted and remains it will penetrate the subconjunctival tissues and also burn the integument externally.

A CASE OF EARLY DIAGNOSIS OF A CHOROIDAL SARCOMA. REMOVAL OF THE EYEBALL AND EXAMINATION.

BY ADOLF ALT, M.D., ST. LOUIS, MO.

WHILE the number of cases of choroidal sarcoma reported in literature is already very large, and while, undoubtedly, every oculist has seen quite a number of such cases without reporting them, cases with an early diagnosis and an early removal are still quite rare. Many a case which has been seen and diagnosed at a very early period only comes for removal at a very late stage, and usually the surgeon who operates is not the one who has made the early diagnosis.

It is not easy to make such an early diagnosis to one's entire satisfaction, as there are the fewer absolutely diagnostic symptoms the smaller the growth is, and there always remains a certain risk in recommending the removal of an eye with comparatively good vision and causing but little trouble to the individual. Yet, on the other hand, we may in such doubtful cases, by considering carefully all possibilities and probabilities come to a diagnosis which is all but certain, and if we have arrived at this and the patient has sufficient confidence in our judgment to assent to the removal of the eye at such an early period, the subject is almost certain to be rid of this disease for the future.

There can be no doubt as to the propriety of removing an eye with a choroidal sarcoma at as early a stage as possible; yet, the question still remains an open one, by what means can we make sure of our diagnosis at an early stage?

The following case in point represents the earliest stage at which I have been able to make such a diagnosis and to verify it by examination of the enucleated eyeball. I am aware of the fact that a few cases are known which were similar to mine, and I know that the late O. Becker diagnosed and removed a choroidal sarcoma which was not even half the size of mine, although I do not know whether he ever reported the case. It is not referred to by Fuchs in his monograph.

December 12, 1897, J. D., an apparently perfectly healthy

and strong railroad man, 31 years of age, came to consult me about his sight. He stated that for several weeks he had noticed a peculiar sparkling and a shadow before the left eye. That was all he complained of.

Status præsens.—Outwardly both eyes appeared perfectly normal. Iris and pupillary reaction normal. V. R. E. $20/XL?$ with $+1.5 D. 20/XX$. V. L. E. also $20/XL?$ with $+1.5 D. 20/XXX$, not further improved. Tn. Perimetric examination revealed an oval scotoma which began about 10° outwardly from the site of the papilla optica and seemed to reach to the very periphery, although it was not of equal density in all parts. Its longest diameter corresponded with the horizontal meridian and it reached to about 15° above and below it at its widest portion.

Corresponding with this defect the ophthalmoscope revealed to the nasal side of the papilla optica an area of a diameter of about $4\frac{1}{2}$ papilla diameters in the horizontal, and 3 in the vertical direction, which was slightly raised above the surrounding retina. From its highest prominence it gradually fell off to the level of the surrounding tissue. This raised area appeared yellowish-white with red patches, the retina was slightly wrinkled, the blood-vessels passing over the raised area were slightly tortuous.

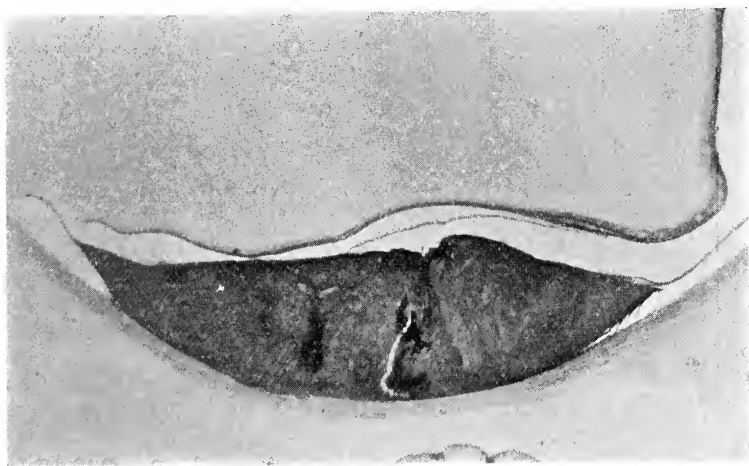
From the general good health of the patient and from the lack of any symptoms of syphilis or tuberculosis, as well as of any inflammatory symptoms, I concluded that in all probability I had to deal with a choroidal sarcoma. I informed the patient that I suspected this, but that my diagnosis was not absolutely certain and that I would wait a little longer before deciding on what to do. Seeing no particular use in treatment I ordered none.

January 18, 1898, the patient returned to my office, stating that he thought he could not see quite so well and that the sparkling annoyed him in his work. I found V. to be the same, the scotoma, perhaps, a little larger.

The only difference in the ophthalmoscopic appearance was that a number of pigmented spots had appeared, especially in the center, and some larger and smaller ones in the periphery, giving the raised area a more grayish tint. Tension was still normal; there was no pain and no other new symptoms.

I now told the patient that I felt almost certain that he had a sarcomatous growth in this eye, which if allowed to remain and grow would certainly endanger his life. That, on the other hand, a removal of the eyeball containing the sarcoma, at so early a date, would, as far as experience could tell, remove this danger from him. Being the father of a family for whose welfare he felt it his duty to preserve his life and working capacity as long as possible, he unhesitatingly consented, February 3, 1898, to have me remove the eye.

The healing, after the operation, was normal and uninterrupted.



On dividing the eye after hardening for 24 hours in formol, the macroscopical appearance of the background of the eye corresponded with the ophthalmoscopic picture. The raised portion did not, however, reach as far peripherally as the scotoma had led me to believe. Cutting vertically through the highest part of the raised area I found a firm flat tumor, to the apex of which the retina was more firmly adherent than in other parts, no layer of exudation was visible between the retina and tumor. This tumor measured in the horizontal direction, where it was largest, 10, and in the smallest portion, 7 mm., its height nowhere exceeded 3 mm.

Microscopically this tumor, as is usual with those found in this region, consisted of densely packed spindle-cells, which formed larger bands, crossing each other in different directions.

Here and there aggregations of round-cells were found. The spindle-cells in places, and more particularly near the edges of the tumor, contained pigment granules of various shades of brown. At the margin the tumor gradually passed over into a normal choroid. No tumor-cells had penetrated backwards into the sclerotic, although the tumor was adherent to this membrane.

The surface of the tumor was covered, except in its highest central portion, by the lamina vitrea and the pigment epithelium layer. The cells of the latter were proliferating so as to form considerable cell aggregations in spots. The microscope also revealed a minute layer of a homogeneous exudation containing pigmented cells and pigment granules, which caused the adhesion between the retina and the tumor. In the center of the tumor where this adhesion was firmest some pigment cells had entered the retinal tissue. The retina as far as in contact with the tumor showed enlarged and filled blood-vessels, the rods and cones were missing or undergoing degeneration and the parallelism of the granular layers was disturbed. The nerve-fiber layer was somewhat infiltrated with round cells. The remaining tissues of the eyeball were somewhat hyperæmic, but not otherwise altered.

As, I think, I had a perfect right to expect, there has been no recurrence to this day (19 months) and I do not apprehend any in the future.

The report of this case was prompted by a paper by P. Silex, of Berlin (*Berliner klin. Wochen.*, August 7, 1899), "On the Early Diagnosis of Choroidal Sarcoma," of which the following is a partial translation:

November 4, 1898, Dr. X, then about 50 years of age, who had previously been examined elsewhere, called on me to give him my diagnosis. He said that his health was good, that he was myopic but could see well, except that for some longer time he had now and then noticed a peculiar sparkling before his right eye.

I found R. E. M. = 3, 5 D., V. = $\frac{2}{3}$; L. E. M. 5, 5 D., V. = $\frac{2}{3}$. He read smallest print well with either eye. T. was equal and not increased. The field of vision when tested with the fingers was complete. The perimeter showed outwards from the point of fixation a small, so-called relative negative

scotoma, that is, the white object, 5 mm. square, was not perceived as well in this part.

The ophthalmoscope revealed in both eyes narrow temporal staphylomata, corresponding with the myopia, otherwise a normal fundus, excepting in one small portion in the right eye.

Here in an area of 2 papilla diameters in a vertical, and 3 in a horizontal direction; the retina was prominent and gray-green, with a wave-like yellow-white striation. This area began a half papilla diameter inward from the disc and reached, with its upper margin, a line drawn through the middle of the disc in the horizontal meridian.

The elevation of this dim area was at its highest $1\frac{1}{3}$ mm. and gradually fell off toward the margin. I could not make certain whether or not this portion of the retina floated. The blood-vessels, which in this place are commonly hardly noticed, appeared, in comparison with the other eye, very distinct, on account of their containing more blood, and of the dimness of this portion of the retina. In the course of the observation they helped in judging the possible growth of the affected part. Examination of the inverted and upright image gave this same result.

"I ask for your opinion," said the doctor, who knew the malignancy of sarcoma. In my mind there was at once no doubt of sarcoma; yet the smallness of the supposed tumor as well as its slow growth, made me waver.

And, yet, what else could we think of.

1. It might be a simple, but rare form of myopic detachment of the retina; this was supported by the myopic refraction, the age of the patient, the gradual falling off toward the margin, the absence of glaucomatous symptoms after instillation of atropia. Graefe, in his time, considered this last symptom as of the greatest importance. On the other hand, the slow development, the unchanged localization, the normal tension (detachment of the retina is usually accompanied by reduced tension) and the perfectly normal vitreous body, spoke against detachment. In spite of long-continued search I could not detect a single opacity in the vitreous body. I want to lay particular stress on this point, as I do not remember to have missed such in a single case of simple detachment of the retina. Even with the temporary detachment of the retina

due to choroidetinitis albuminurica gravidarum, I have usually found opacities in the vitreous body. The color gave no decided indication. When such tumors are larger and lie close to the retina we are sometimes enabled to draw conclusions from a certain yellow hue which is mixed with the gray-green, yet this does not always prove true. When, however, the retina is separated from the tumor by an exudate, the picture often exactly resembles that of a simple detachment. On account of the smallness of the swelling in our case, protrusions and folds of the retina were of no value as diagnostic signs, as they sometimes are.

My opinion, therefore, was for a tumor, but the diagnosis was not certain. On account of the situation of the focus I did not think it advisable to make a scleral puncture nor an explorative puncture with the Pravatz syringe, after the recommendation of Schweigger.

2. Detachment of the choroid. This extremely rare affection, which presents the picture of a round prominence and in which the normal choroidal vessels are visible through the retina, was out of the question in our patient, as such cases always show a diminished tension.

3. Exudative choroiditis with secondary detachment of the retina. Such cases usually show external signs of inflammation and exudation in the vitreous body; yet, there are some forms which give a picture very similar to the one in our case. I have seen them in lues; inunctions brought about restitution. Sometimes other uncertain ætiological factors seemed to be at work. I discarded this diagnosis in the case under consideration on account of the absence of lues as well as of any other constitutional anomaly and of the localized character of the affection.

4. Choroidal hæmorrhage. The color, the localization and the absence of any plausible ætiological factor, made this diagnosis impossible.

5. Subretinal cysticercus. The shape, the absence of movements, of vitreous opacities and choroidal foci, the scarcity of cysticercus since the introduction of slaughtering-houses in all towns permitted me to disregard this possibility at once.

6. Conglobated tubercles of the choroid. But the doctor was perfectly healthy.

7. Gumma between retina and choroid. Gumma is not

infrequently found in the ciliary body, I have never seen it in the choroid, and since I have seen an exceedingly large number of patients, this is probably of an extremely rare occurrence. Yet, in our case, there was no lues and vitreous opacities which, with preference, accompany choroidal affections, were lacking.

Considering all these points I arrived at the diagnosis of sarcoma, but since there remained the possibility of an error, I advised inunctions and sudorifera, besides iodide of potassium.

After thirty inunctions no improvement had taken place; on the contrary, the detachment seemed increased.

It was a serious matter to decide to propose the enucleation of an eye which still had $V.=\frac{2}{3}$ and which caused no farther disagreeable symptoms than an occasional sparkling.

January 17, the eye was enucleated, with ether narcosis. Healing was uninterrupted.

In the hardened and divided eyeball, down and inward, beginning immediately at the papilla, a flat detachment of the retina was found, of about 12 mm. diameter, directly behind and separated from it by a layer of coagulated exudation, barely 1 mm. thick, a flat, roundish tumor, dark-gray in color, of firm consistency at its margin, gradually passing over into the apparently healthy choroid. At the sclera this tumor ended with a sharp edge, being firmly adherent to the membrane, but nowhere entering it. The largest diameter of the tumor was 6, the smallest 2 mm.; its thickness nowhere beyond 1.5 mm.

Microscopically the tumor consisted of spindle-shaped cells of medium size with a large, distinct nucleus; they were very closely packed and no intracellular tissue was found. In some parts there were small round cells between the tumor-cells, and in some areas an areolar arrangement existed. In these areas the round cells were especially numerous. There was, further, present a large amount of black-brown pigment, in small separate granules as well as in large conglomerate masses. The cells were arranged in broad tracts crossing each other trabecula-like; between these, especially near the thinner edge of the tumor, a number of broad spaces with thin walls were found completely filled with red blood-cells. The transition into the choroid is a perfectly natural one. From which layer of the choroid the tumor took its origin could not be

determined. The tumor was covered by the retinal pigment epithelium, then followed a thin layer of homogeneous coagulated exudation containing a few pigment granules. Then came normal retina.

The tumor was, therefore, a melanotic spindle-cell sarcoma of the choroid which had not entered the neighboring tissues.

In the extensive work of Fuchs, referring to 195 cases of melanotic choroidal sarcoma, there are only two cases similar to ours, one by Hirschberg, with $V.=\frac{1}{2}$ and one by Knies, with $V.=\frac{2}{7}$.

Considering that in our case the tumor was extremely hard and firm, that in consequence its dissemination by broken particles was very improbable, that it was very poor in blood-vessels and pigment, that it was as small as probably ever any such tumor which was removed by operation, I am of the conviction that our patient can look joyfully into the future and that he will be spared metastatic recurrences.

A CASE OF GLAUCOMA, CHRONICUM SIMPLEX, IN A GIRL THIRTEEN YEARS OF AGE, EVIDENTLY INDUCED BY THE IN- STILLATION OF ATROPINE.

BY ADOLF ALT, M.D., ST. LOUIS, MO.

IN THIS Journal (January, 1893) Dr. S. C. Ayres reported a case of glaucoma in a girl, 18 years of age, whose eyesight had been failing for two or three years. The disease then had probably attacked the girl when 15 or 16 years of age.

Cases of glaucoma in the young are so seldom seen that a report of the following case, which I have only seen a few days ago, may prove of interest:

Miss C. R., 18 years of age, of Los Angeles, Cal., was brought to my office on account of blindness of the left eye, and increasing loss of vision in the right eye.

The following history was obtained: Five years ago the mother took the girl to see an oculist on account of what

seemed to have been asthenopic symptoms. In order to examine the refraction the oculist instilled several drops of atropine. Almost immediately thereupon the left eye became blind and ever since its pupil has remained dilated, *ad maximum*. This condition has remained unaltered to this day. Once in a while she has had pain in this eye and on the side of the head. The right eye never was as good after the instillation of atropine, and has ever since been failing more and more, and now is, as the patient expressed it, half-sighted.

She was told that this terrible and unforeseen result of the instillation of atropine was caused "by an affection of the great sympathetic due to female troubles. The latter again were due to her being menstruated every two weeks since her 12th year, and to an imperfectly perforated hymen." This latter deformity had been removed by operation a few months ago.

The girl was tall and slender, but not unhealthy in appearance.

I found the left pupil dilated *ad maximum*, and immovable on the stimulus of daylight, slightly movable with strong artificial light. V.=0. A few enlarged episcleral veins; +T2 (?). Very deep glaucomatous excavation in a myopic eye.

The right eye also showed a few enlarged and slightly tortuous episcleral veins. The pupil was very large, but sluggishly contracted on the stimulus of light. V= $\frac{15}{60}$ excentrically, with -1 D. \bigcirc -0.75 D. cyl. ax. 90° $\frac{20}{c}$. No further improvement; +T1. The field was reduced to an oval with the largest diameter horizontally beginning almost at the macula lutea. Within this field and near the macula a small relative scotoma of a diameter of about 10° could be made out. The papilla showed a glaucomatous excavation, but not quite peripheral, and not as deep as in the fellow eye.

The treatment in these five years seems to have been only the changing about every six months of the glasses, although she confessed that eserine had been given her, but being afraid of drops in her eye, she had not used them again after the first trial, which proved somewhat painful.

MEDICAL SOCIETIES.

PROCEEDINGS OF THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

FRIDAY, JULY 7, 1899.

H. R. SWANZY, F.R.C.S.I., President, in the Chair.

CHANGES IN THE CONJUNCTIVA PRODCTED BY CHRONIC INFLAMMATION.

MAJOR H. HERBERT, I.M.S., read a paper on this subject. He said that (1) in the conjunctiva one might trace the development of normal adenoid tissue from ordinary connective tissue. The cells became more numerous, and many connective tissue cells were changed into large plasma cells diffusely scattered, and into small round cells, mostly grouped into follicles and lymph heaps. These small round cells or lymphocytes were young plasma cells, and always had among them larger plasma cells undergoing mitosis. (2) In follicular conjunctivitis and trachoma the new follicular formations might differ from normal in being deficient in supporting stroma and blood vessels. The first stage of deficiency was seen in columns of young cells lying free in lymph spaces; a more advanced stage was found in much larger collections lying in lymph vessels, encapsulated by the vessel walls. (3) In the retrogression of follicles the cells were (*a*) carried away in the lymphatics, or (*b*) became amœboid and traveled to the surface or passed directly into small blood vessels, or (*c*) underwent colliquative and hyaline degeneration. (4) Scar tissue might be formed in very chronic simple conjunctivitis. (5) Large palpebral papillæ like those of spring catarrh might develop from trachoma follicles (cases were quoted and tissues shown). (6) Conjunctival cysts in great number in the upper tarsal membrane might arise from distension of tubular epithelial downgrowths, the result of chronic, generally trachomatous, conjunctivitis (a series of

cases analyzed and cyst contents investigated). (7) Stellwag's brawny trachoma appeared to be due to a basophile degeneration of connective tissue fibers.

MR. SYDNEY STEPHENSON, after remarking on the value of the new methods of staining, said he had been interested to note that in trachoma the changes began in the lymphatic spaces and follicles. This explained the enlargement of the preauricular and cervical glands, and occasionally of other glands, seen in this disease. He also remarked on the unimportance of goblet cells, and of mast cells found in the conjunctiva. He asked if Major Herbert had been able to find any difference between follicular and granular conjunctivitis in his specimens.

In reply, MAJOR HERBERT said he had been unable to detect any difference.

PLASTIC OPERATION FOR CONTRACTED SOCKET.

MR. F. RICHARDSON CROSS described this operation. Last year before the Society he had described an operation for contracted socket, which consisted in a free division of the conjunctiva at the bottom of the socket and also of the tissues deeper in the orbit, and the insertion of a flap of skin from the temporal region turned on its pedicle, and placed at the deepest part of the socket. The case on which he had done the operation was still a success, and the skin had become much like conjunctiva. He had recently modified the operation by taking a finger-shaped flap from the upper lid, and inserting in the deepest part of the socket; he had obtained more effect by this operation; the skin of the lid took on a conjunctival character sooner than the skin from the temple. In answer to the PRESIDENT he said no ectropion resulted.

A CASE OF PENETRATING WOUND OF THE ORBIT FOLLOWED BY MENINGITIS; TREPHINING; RECOVERY.

DR. ROCKLIFFE and MR. HAINWORTH reported this case. The patient was struck in the left eye in a drunken brawl by a foreign seaman, evidently with a pipe in his hand, whereby $3\frac{1}{2}$ inches of the stem, mounted by a copper band, were driven deeply into the orbit; a considerable amount of force was required to dislodge it from its firm position, and when removed

the stem was plugged with some doubtful matter. The wound being thoroughly cleansed by perchloride and dressed with carbolic acid, all went well until the seventh day; when, preceded by frontal headache, the pulse dropped to 48, and the temperature became subnormal; followed on the eighth day by a rigor and rise of temperature to 102.2° . A localized abscess being suspected, the left temporal region was trephined; no pus was found, but a considerable amount of fluid withdrawn by a trocar from the lateral ventricles. With the exception of further rigors, accompanied by subnormal pulse, the patient made a complete recovery in one month, during which he had right partial facial paralysis, left external strabismus, and partial aphasia, due, as Mr. Hainworth surmised, to irritation of the VIth, and damage to Broca's convolution by the trephine, the rigors being explained by possibly some irritation set up around the seat of the operation. Cases were quoted showing the usual frequent mortality in such injuries.

CARD SPECIMENS.

MR. LINDSAY JOHNSON—Macula Chromoscope.

MR. J. D. AMENABAR—Suction Apparatus for Soft Cataract.

MR. H. JULER—Sclerosing Keratitis.

MR. C. D. MARSHALL—Two Specimens Showing Grains of Gunpowder in the Eyeball.

MR. JOHN GRIFFITH—(1) An Unusual Form of Retinitis; (2) A microscopic Specimen of a Perithelial Sarcoma of the Choroid.

MR. H. GRIMSDALE—Nævus of the Iris.

MR. W. T. HOLMES SPICER—Œdema of Lids.

MR. F. RICHARDSON CROSS—A Dressing Basket for Eye Work.

MR. E. C. FISCHER—Case of Detached Retina Cured by Rest.

MR. DOYNE—Opacity of Cornea.

MR. ARNOLD LAWSON—Case of Spring Catarrh.

MR. DONALD GUNN—Tuberculous Ulcer of Lid.

ELECTION OF OFFICERS.

The annual general meeting was held afterwards for the

adoption of the report. The following officers were elected for the next year:

President—G. Anderson Critchett.

Vice-Presidents—E. Nettleship, Henry Eales (Birmingham), W. A. Brailey, M.D., Priestley Smith (Birmingham), F. R. Cross (Clifton), George Cowell, H. R. Swanzy, P. H. Mules, M.D. (Wrexham), Henry Juler, S. J. Sharkey, M.D.

Treasurer—John Abercrombie, M.D.

Secretaries—James Taylor, M.D.; E. Treacher Collins.

Librarian—W. Adams Frost.

Other Members of Council—Charles J. Oldham (Brighton), Howard H. Tooth, M.D., W. A. Turner, M.D., G. E. Wherry, M.B. (Cambridge), S. H. Habershon, M.D., J. B. Lawford, W. J. Cant (Lincoln), Sydney Stephenson, George Mackay, M.D., (Edinburgh), Patrick Maxwell, M.D. (Dublin), Charles Shears (Liverpool), W. T. Holmes Spicer.—(*British Medical Journal*).

SIXTY-SEVENTH ANNUAL MEETING OF THE BRITISH MEDICAL ASSOCIATION.

SECTION ON OPHTHALMOLOGY.

PORTSMOUTH, AUGUST, 1899.

First Day.

The President of the Section, MR. SIMEON SNELL (Sheffield) opened the business with some few general remarks, and then proceeded to read a paper on "The Prevention of Eye Accidents to Iron Workers by Pieces of Metal Flying Off the Tools or the Moulding." He strongly advocated the wearing of some protecting device, and showed some wire gauze which he highly recommended; glass, even the hardest, was of but little use except to grinders. He thought that the use of pneumatic clippers, the arrangement of the workers with canvas shields interposed, and the wearing of suitable protectors, would render eye accidents very uncommon.

MR. RICHARDSON CROSS (Bristol) opened the discussion on

the "Pathological Signification of Sympathetic Irritation and Sympathetic Ophthalmia," and entered most fully into the question. He thought that the microbic, combined with the reflex nervous, theory would together explain some points at present unexplained, by either theory alone.

DR. LANDOLT (Paris) strongly condemned irritating a wounded eye by injections and other treatment, and thought that dangerous eyes should be excised.

MR. MCHARDY was pleased to find such unanimity of opinion concerning the treatment of the disease.

Surgeon-General CALEY recounted an interesting case in which the irritative symptoms disappeared on removing the eye.

MR. DEVEREUX MARSHALL discussed at length current pathological theories, and mentioned the results of some of his examinations.

DR. DE SCHWEINITZ (Philadelphia) said he entirely agreed with the previous speakers, and agreed with Dr. Devereux Marshall in his criticism of Deutschmann's theory. He strongly advocated examining not only the eye but also the blood and other organs which might throw some light on the disease.

DR. REEVE (Toronto) recounted two cases.

DR. A. BRONNER (Bradford) also mentioned a case which followed a blow on one eye from a fist.

THE PRESIDENT congratulated Mr. Cross, and fully agreed that at present there was no treatment save removal of the eye.

DR. A. BRONNER (Bradford) read a paper on "The Use of Homatropine Drops in Some Cases of Muscular Asthenopia," and gave several examples of cases.

THE PRESIDENT was greatly in favor of homatropine and cocaine drops.

MR. ARNOLD LAWSON thought that in most cases homatropine was sufficient, but that occasionally atropine was indispensable.

DR. LODGE recounted some cases he had operated upon for high myopia with good results.

MR. RICHARDSON CROSS thought that no one who had done the operation would be likely to give it up as the results were so satisfactory.

DR. BRONNER thought that high myopia was more common than was generally supposed, and that early linear extraction was essential.

MR. JULER was of the same opinion.

THE PRESIDENT thought that the anterior capsule should be freely opened, and the lens matter let out without delay.

Second Day.

MR. E. TREACHER COLLINS read a paper on "Exophthalmos." He divided the cases into traumatic and non-traumatic. He described five cases, and showed photographs of the patients in the lantern. He entered in an elaborate manner into the theories he entertained concerning the disease.

THE PRESIDENT said that he had seen several cases of a similar nature.

DR. DE SCHWEINITZ said that he had recorded a case in which he thought the exophthalmos was due to orbital cellulitis.

MR. RICHARDSON CROSS mentioned a case which followed an operation on the Gasserian ganglion for severe fifth nerve neuralgia.

Deputy Surgeon-General CAYLEY opened the discussion on "The Visual Tests Employed in the Navy, Army, and Mercantile Marine, and Their Efficiency." For the army recruits the sight required was about one fourth of normal vision; this was equal to myopia of about 1.75 D.; while for the departments and militia it was only half this, and equalled myopia of about 3.5 D. With modern weapons he considered that this minimum vision required was too low. Color-blindness and hypermetropia might pass undetected in the soldier. For a commissioned officer the test was more severe. For the Royal Navy normal sight was essential, though there was a rider which allowed the examiners some latitude. There were, however, no absolute rules to guide the surgeons. In the mercantile marine the regulations were all in confusion. For ordinary seamen no test whatever was used, and the rules were too slack to ensure good sight even for officers. For the English pilot service no test was enforced, while in the Indian pilot service strict tests were applied.

DR. LANDOLT (Paris) then read a paper on "The Determination of Acuteness of Vision, the Principle of Its Determination, and the Tests for Visual Acuity." He demonstrated and explained his new tests, which roughly consisted of a broken circle in which the candidate had to state the position of the gap.

THE SECRETARY then read some notes by DR. GEORGE

MACKAY, who quoted numerous cases in which the patients had become inefficient on account of defective vision, which might easily have been determined by suitable examination before they were admitted.

MR. T. H. BICKERTON read a paper on the part that color-blindness and defective vision played in the production of collisions at sea at night and at other times.

MR. MCHARDY confined his remarks to the tests used in the Royal Navy; while Colonel DRAKE-BROCKMAN, I.M.S., expressed the opinion that the present sight test was most inefficient with modern methods.

MR. RICHARDSON CROSS thought that physique as well as eyesight should count for far more than it did. He was quite sure that the tests were inefficiently applied, and could be dodged to a great extent.

MR. DEVEREUX MARSHALL asked if captains of guns were ever examined after their admission into the service, and he also mentioned the inefficiency of the application of tests for stokers in the navy.

Deputy Surgeon-General CAYLEY, in reply, stated that he thought there was no further examination made after the men were admitted, unless they were detailed for special service.

MR. JOHN GRIFFITH read a paper on "Primary Sarcoma of the Conjunctival Fornix," upon which remarks were made by MR. DEVEREUX MARSHALL and MR. TREACHER COLLINS, who mentioned cases.

DR. JAMES HINSHELWOOD read a paper on "The Use of Euphthalmin; a New Mydriatic." He considered that euphthalmin, although it did not completely fulfill all the conditions of an ideal mydriatic, yet approximated to this more closely than any other mydriatic, as it caused rapid dilatation of the pupil, which soon returned to its normal condition.

A resolution concerning the tests used in the mercantile marine was passed, and was subsequently reported to the concluding general meeting of the Association on Friday.

Third Day.

DR. BULL (Paris) read a paper on "The Stereoscope as a Test for the Ocular Muscles," and described the various tests he employed by means of the stereoscope.

MR. WATSON GRIFFIN (Brighton) described five cases illus-

trating the value of the correction of hyperphoria with vertical prisms, in which the patients were unable to use their correction without the prisms.

DR. REEVE (Toronto) thought that in one of Mr. Griffin's cases, which was corrected with 0.23 prism in each eye, a slight decentering of the glass would be equally effective, though in his own cases he often found that more hyperphoria became manifest after the original correction.

MR. ARNOLD LAWSON read a paper on "The Correction of Refractive Errors in the Treatment of Trachoma." He described two cases in which, after a temporary improvement with local treatment, they ceased to get better, but when the refractive errors were corrected they rapidly got well. He strongly recommended the use of glasses when the corneæ were sufficiently clear to estimate the refraction.

Colonel DRAKE-BROCKMAN, who had had great experience of the disease in India, used to correct the refraction as a routine treatment, and was certain of its beneficial effect in many cases.

DR. DE SCHWEINITZ, though he had no actual experience in the modification of trachoma by means of the correction of refractive errors, thought that like many other inflammatory affections it was likely to be benefited by such correction.

A paper by DR. JOHN HERN on "The Eye Symptoms in Hay Fever" was read by the Secretary. In it Dr. Hern described the symptoms, but was uncertain as to its cause.

MR. DEVEREUX MARSHALL, who was well acquainted with the symptoms from his personal experience, said he had found treatment most unsatisfactory, and was by no means certain as to the cause.

A paper by MR. KENNETH SCOTT, of Cairo, on "Destructive Ulceration of the Eyelid" was, in his absence, read by the Secretary.

MR. ARNOLD LAWSON suggested that the case was one of gumma of the conjunctiva, and Colonel DRAKE-BROCKMAN said that he had seen cases exactly resembling this which were undoubtedly syphilitic; he had seen gummata greatly benefited by euphen.—*British Medical Journal*.

OBITUARY.

ALFRED GRAEFE.

Alfred Graefe, whom but recently death has torn from us, was one of the few who witnessed, during their lifetime, from the very beginning, the enormous development of ophthalmology following the invention of the ophthalmoscope. He was a cousin of the famous Albrecht von Graefe, who almost alone has laid the foundations of the whole modern ophthalmology; he was his friend, and proudly called himself his pupil. In him he had a teacher who, though of almost the same age, by the greatness of his mind and heart, exerted a powerful and lasting influence on Alfred's further development. His great teacher introduced him into the course in which, accompanied with the highest success, due to his own diligence and innate talent, he continued till the end of his life.

The following short notes concerning Alfred Graefe's life we owe to the pen of his youngest son, who kindly permits us to use them.

Alfred Graefe was born November 23, 1830, in the castle of his grandfather, Martins-Kirchen, near Muehlberg an der Elbe. His earlier years were spent there and at Weissenfels, where his father owned a small charming estate. His education was carefully conducted by his excellent father, who had served under Napoleon in the unfortunate Russian campaign, and had been rewarded with the Cross of the Legion of Honor.

The boy's mother, who excelled in gifts of the mind, was probably the one to first arouse in him the sense for the beautiful in art which later on marked the man.

Graefe wanted to join the military service like his father; but, after having absolved the Gymnasium, he changed his plan and decided to study a profession. Soon after he entered the University of Heidelberg as a happy student. He remained true to his love of the science of mathematics for which he had shown great interest at the Gymnasium and this explains why, among the different medical specialties, he was attracted

particularly by ophthalmology. From Heidelberg he went to Wuerzburg, then to Halle, Leipzig, Prag, Berlin and, finally, to Paris, where, like his cousin and teacher, Albrecht von Graefe, he finished his studies.

During the time of his academic studies Alfred Graefe was intimate with Bodenstedt, Koegel, the late Court Preacher, and with the poets, Julius Grosse and Otto Roquette. Having finished his studies he married the daughter of City Councilman Dr. Colberg, an excellent and prominent citizen of the City of Halle. Graefe's married life was of the happiest, and it is probably owing to the most sacrificing love and care of his wife that he was so long preserved for the good of, and as an ornament to humanity.

The young married couple moved to Berlin, where they rented a modest house on Karl street, opposite the Clinic of his famous cousin. In the position of first assistant to Albrecht von Graefe, Alfred Graefe had the opportunity to lay the foundation for his future development. The noble conception of the medical profession which he was taught by his cousin Albrecht, was readily accepted by Alfred and prompted him to the unselfish emulation of so high a model. In fact, Alfred Graefe always practiced medicine in the sense of a friendly benefactor.

Having remained for five years (1853 to 1858) with Albrecht von Graefe, Alfred went to Halle and located there in 1858. At the same time he founded the later on so famous eye clinic, at first with only nine beds. Soon this clinic so modestly begun became insufficient. The people came in greater and greater numbers to seek his aid. In 1873 he was created Professor of Ophthalmology, and in 1875 he could give room and care in the newly-built clinic to about 130 patients. His wife assisted him in this with the greatest devotion; she superintended with care both the extensive private and public clinics.

Graefe's literary talent, too, merits decided recognition. The friend of his youth, Julius Grosse, Director of the Schiller Archives at Weimar, said that should the duties of a busy practitioner permit, his name would be mentioned among the first in literature. And Graefe managed to find some time for literary work. Although he did not give his poems to the

general public, yet a small collection, full of beautiful thoughts, was published as manuscript for his circle of friends.

The first larger work which Alfred Graefe published while still an assistant (1858) has the title: "Clinical Analysis of the Affections of the Motor Apparatus of the Eye." This paper, which was dedicated to "his friend and teacher, Albrecht von Graefe," deals with a subject which he called the one of his preference all through his life. Several smaller papers of his deal directly or indirectly with the same subject; among them his paper on the use of prisms in order to detect simulation, as also his last work, which appeared in 1897, "On the Vision of the Strabotic." He again selected the same subject for his own special part in the great "Cyclopedia of Ophthalmology," published by him and Th. Saemisch, and he was the first who with renewed vigor re-edited his chapter for the second edition of this great work.

His greatest merit in the field of ophthalmology, in our opinion, lies in the fact that he introduced Lister's ideas of sterilization into our specialty, and into use in operative procedures on the eye, especially in the extraction of cataract. At first Lister's idea was to free the surrounding air from infectious germs by means of carbolic acid; in this form it could not be applied to eye operations. After experimenting for several years Alfred Graefe found a method which was suited for such operations. He could proudly state that in 114 subsequent cataract extractions he had had only three losses, one of which was clearly brought about by the patient himself. Such favorable results had never previously been obtained. Although this magnificent result, which excelled all previous experience, was somewhat reduced by the experience of subsequent years, yet to Alfred Graefe belongs immortal glory in having paved the way for the aseptic and antiseptic methods of operating on the eye, to deviate from which would to-day be considered a crime.

Suppuration after cataract extraction, by which, in olden times, innumerable eyes were destroyed, and against which Alfred Graefe had fought, in vain, with all his energy, since the introduction of Lister's antiseptics has become a rarity. The last 1074 extractions which Alfred Graefe reported, with statistics, showed a loss of 0.93 per cent. Once he operated 448 times in succession without a single case of suppuration.

The same loss in consequence of suppuration (0.9 per cent.) is given in the report of 1000 cataract extractions performed in the clinic of Dr. Karl Theodor, Duke in Bavaria, in which asepsis and antisepsis were observed in the most painstaking manner, and similarly good results are probably obtained to-day in all clinics in which minute attention is paid to the rules of Lister's antisepsis.

Since the invention of the ophthalmoscope the introduction of Lister's method into ophthalmological practice is, without doubt, our greatest gain.

Another field of ophthalmological practice in which Alfred Graefe has never been excelled, is that of the cysticercus in the human eye, and its removal. It is well known that soon after the invention of the ophthalmoscope Albrecht von Graefe, as the first, saw cysticercus in the interior of the eye, and removed it on several occasions successfully by operative procedures. In the course of years Alfred Graefe had occasion to see and treat more such cases than any living oculist. He practiced this peculiar operation on the eye methodically, and constructed a special localizing ophthalmoscope in order to be able to perform this operation with the greatest security and accuracy.

Once, having removed two cysticerci in one sitting from one and the same eye (July 12, 1892), he, in a jovial manner, announced to his friends and acquaintances elegantly printed on a gold-bordered card: "The happy delivery of two lively cysticerci."

To consider his many ophthalmological papers is not possible in this place. Most of them have appeared in *Graefe's Archiv f. Ophthalmology* and in the *Monatsblätter f. Augenheilkunde*. From their form and contents they will for all future times remain welcome and instructive reading and ornaments to these publications.—*Klinische Monatsblätter f. Augenheilkunde*.

CARL WALDHAUER.

Carl Waldhauer was born December 20, 1820, at Sallenen, in Kurland, and died April 30, 1899, at Mitau, in Kurland.

Again one of the oldest pupils of von Graefe has departed. In 1858 Waldhauer located at Riga as oculist, and from 1863 to 1879, was director of the Widow Reimers' Eye Hospital. His work here was blessed with great success. He also educated a number of young oculists. Later on he moved to Mitau, but was forced to give up his practice on account of a serious disease of the eyes.

His publications all dealt with practical ophthalmology, especially with the operation for trichiasis, which is so frequent in Kurland where trachoma is extremely prevalent, with interesting cases and injuries. He was in looks and manners a true German, and will live in the memory of all who were fortunate enough to know him.

The following are the most important of his publications: Cataract Punctata (*Arch. f. Ophth.*, XXXI, 1); Tumors of the Eye and Orbit (*Petersburg. Med. Woch.*, 1877); Operation for Ptosis (*Ibid.*, 1886); Diabetic Cataract (*Ibid.*, 1884); l'Operation du Trichiasis (*Arch. d'Ophth.*, 1882); An Iris Anomaly (*Klin. Mon. Bl.*, 1866); Sympathetic Ophthalmia (*Ibid.*, 1883); Operation for Trichiasis (*Ibid.*, 1897); An Injury to the Eye (*Centbl. f. Augen.*, 1889); Foreign Bodies in the Orbit (*D. Z. f. Chir.*, XXIX).—*Cent. f. p. Augenhlk.*

NEWS ITEMS.

IN JENA a new University Eye-Clinic has just been completed, Professor Kuhnt is the Director.

DR. HERMANN SNELLEN, JR. has been made Professor of Ophthalmology in the University of Utrecht, Holland.

DR. G. C. HARLAN has been elected President of Wills' Eye Hospital, Philadelphia, and Dr. Charles A. Oliver, Secretary of the Staff.

THE ROYAL LONDON OPHTHALMIC HOSPITAL, formerly at Moorfields, has been moved to a beautiful new building in the City Road. It has 50 beds.

A NEW EYE-CLINIC has been opened in the University of Breslau. It is due to Professor Foerster's effort that it was built. His successor, Professor Uhthoff, is the Director. It has 48 beds.

DR. R. L. RANDOLPH was awarded the Alvarengo Prize by the College of Physicians and Surgeons of Philadelphia, for an Essay on "Regeneration of the Crystalline Lens," an experimental study.

OUR ESTEEMED collaborator and friend, Dr. B. E. Fryer, has resigned the chair of Ophthalmology in the University Medical School of Kansas City. He has been elected Prof. of Ophthalmology in the Medico-Chirurgical and in the Woman's Medical College of Kansas City. Dr. J. S. Lichtenberger received the appointment of Adjunct in this branch in the same schools.

PAMPHLETS RECEIVED.

"The Modern Use of Synthetics," by R. W. Wilcox, M.D.

"Advice to Gonorrhœal Patients," by F. C. Valentine, M.D.

"Vesicular Degeneration of the Chorion," by C. E. Black, M.D.

"Annual Report of the St. Louis Mullanphy Hospital for 1898."

"The Surgical Treatment of Trachoma," by S. P. Eagleton, M.D.

"Ninth Annual Report of the Eye, Ear, Nose and Throat Hospital," New Orleans, La. (1898).

"Historique des Applications Pratiques de la Phonétique Expérimentale," by Abbé Rousselat.

"Fortieth Annual Report of the Nederlandsch Gasthuis voor Ooglijders," Utrecht, Holland. (1898).

"The Employment of the Kalt Suture in Critical Cases of Cataract Extraction," by S. B. Risley, M.D.

"Some of the Failures, Immediate and Remote, met with after Cataract Extraction," by R. M. Ray, M.D.

"Resection of the Cervical Sympathetic in Glaucoma," by T. Jannesco, M.D., translated by J. M. Ball, M.D.

"Implantation of Sponge in the Orbit After Enucleation: A Preliminary Statement," by S. D. Risley, M.D.

"Report of a Case of Accidental Inoculation of the Eyeball with Vaccine Virus," by S. P. Eagleton, M.D.

"One Hundred and Sixty Cases of Cancer of the Pregnant Uterus Occurring since 1886," by G. H. Noble, M.D.

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ORIGINAL ARTICLES.

CLINICAL MEASUREMENTS OF PUPILLARY
REACTION.*

BY LUCIEN HOWE, M.D., BUFFALO, N. Y.

WHETHER one undertakes to examine the literature of pupillometry is soon impressed with three facts:

First—By the rather large number of ingenious and careful studies made, especially of late years, to determine the absolute size of the pupil.

Second—By the comparatively small number of studies to ascertain the frequency, the rapidity or degree of variations in its size, or the causes which produce these variations.

Third—By the fact that while these methods of investigation are well adapted to laboratory experiment, they are of so little clinical value that practitioners have not yet availed themselves of them to any extent, in spite of the importance of the symptomatology of the pupil.

In a single paper it is only possible to indicate briefly, from the clinical standpoint, the various factors in the problem of pupillometry and to refer to an instrument which apparently is of some practical value as a pupillometer. In a subsequent paper more detailed description will be given as to the character and frequency of the movements of the pupil, thus shown.

In all measurements of the pupil there are, of course, two

*Read at the Thirty-fifth Annual Meeting of the American Ophthalmological Society, New London, Conn., July 19 and 20, 1899.

aspects of the problem: the pupil, and the instrument with which it is measured. The variations of the former and the imperfections of the latter constitute the difficulties presented. It should be remembered, of course, at the outset, that the absolute size of the pupil is of relatively little importance, varying, as it does, in different individuals, and being smaller in advanced life than in youth. Silberkuhl¹ has given us the latest and probably the best figures as to the average size, that is, in young people, from 15 to 20 years, 4 millimeters ($4\frac{1}{10}$); in persons of about 50 or more at 3 millimeters in diameter, while between 20 and 50 it varies from $3\frac{6}{10}$ to $3\frac{1}{10}$.

We have, therefore, to review briefly the four factors which produce changes in its size, even though in doing so it is necessary to recall facts already familiar. We naturally think first of variations due to intensity of illumination. That means, of course, that any measurements of the pupil, to be accurate, must bear a definite relation to photometric standards. For very exact measurements a photometer is an undoubted necessity, but in Schirmer's² article, he says that "if the window be covered with two white curtains, which either alone or together can be drawn down, the amount of illumination can be sufficiently regulated." This is also sufficient for most of the clinical examinations made to determine whether or not the iris still retains a considerable amount of mobility.

A very convenient photometer, also, is the radiometer of Crook. Many years ago it was suggested at this Society that this instrument could serve as a photometer, and although it has since been ascertained that the radiometer is influenced by electrical waves, we have also learned more recently from Tesla of the identical behavior, in many respects, of light and electricity, so that any objection to the radiometer is of less weight than formerly.

As we know also that the iris contracts with all efforts at accommodation, let us next glance at the bearing of this upon measurements of the pupil. It is undoubtedly true that when an intelligent subject gives time and patience to the tests, he can be taught to fix a distant object and then one nearer at

¹Graefe's Archiv für Ophthalmologie, 1896, Vol. XLII., Abtheilung III., page 179.

²Graefe's Archiv für Ophthalmologie, 1894, Abtheilung V., p. 12.

will, maintaining the accommodation thus for certain points only. On the other hand, I am convinced that most persons, not trained to such tests, practice what may be called unconscious accommodation with accompanying variations of efforts at convergence. This unconscious accommodation has long been recognized and references to it more or less complete, constantly appear in ophthalmological literature. In *Graefe's Archiv* for 1894, there is an excellent article on "Accommodation and Convergence," by Alfred Graefe, in which this principle is well recognized, although the subject has not yet been elaborated as fully as the relation of accommodation to convergence.

The existence of such unconscious efforts is shown by the almost constant changes in the size of the pupil visible under magnification, even after all other variable factors have been as nearly as possible eliminated. Unconscious accommodation is also indicated by the varying and therefore unreliable nature of our tests of convergence. These tests, either with the rod, phorometer, or other varieties of the prism, may show at one minute a latent convergence of a certain number of degrees, or again, at the end of a few days, or hours, or minutes, we may find the amount of muscular abnormality decidedly different. This is an important point, and influences our conclusion not only as to the mobility of the iris, but as to those obscure muscular conditions for which tenotomies were once more fashionable than at present.

A third group of causes tending to vary the size of the pupil relates to the respiration and circulation. We know, of course, that the pupil dilates with deep inspiration, and that to a certain extent it is influenced by variation in the pulse and blood pressure. With a little care, however, an intelligent subject can be taught to breathe so regularly, that barring pathological conditions of the circulation, this group of causes can be eliminated as a factor in the variation of the size of the pupil.

A fourth factor includes what may be called the psychic causes. These are, naturally, more difficult to estimate perhaps than any other, unless it be, as just mentioned, our control over the tendency to accommodation and convergence. In an exhaustive monograph on "The Movements of the Pupil," by Leeser, as far back as 1881, he calls attention to the importance of this group of causes, showing how sudden fright

will cause wide dilatation, as also the changes which take place in the more moderate dilatation when laughing. It is probable that these or other emotions vary the size of the pupil in a certain degree.

Having thus glanced hastily, as was necessary, at the four different factors which tend to change the size of the pupil, let us pass to the next part of the problem, that is, the instrument with which the pupil is measured.

Estimates of size are made, as we know, in a rough way, by holding a circular opening or a measure in front of the pupil and reading off the diameter (Follin, Lawrence), or it may be measured by a reflecting prism (Schirmer³ and Silberkuhl⁴). It was long ago discovered that the ophthalmometer was also an excellent pupillometer, but as Du Bois Raymond has pointed out, that instrument can be used only when the light is strong and consequently the pupil smaller and more immovable than normal.

The object of these methods is to determine the absolute diameter, but while the studies in this direction have been careful and exact, the fact remains that the pupil is in almost constant motion and the diameter at one instant is certain to change a few seconds later. As before remarked, therefore, the absolute size is of comparatively little importance, within certain limits, and our attention is directed principally to the number of the contractions within a certain time, their degree and their rapidity.

One of the earliest studies to determine the time required for pupillary contraction was made in 1869 by Arlt,⁵ who attempted to measure the rapidity of accommodation and consequent pupillary contraction; more recent studies on this point being by Seashore⁶ and others. Bellarminoff⁷ has measured not only the rapidity of the contractions but their degree and number within a certain time, and his apparatus is so ingenious as to deserve a word of description. He made

³Graefe's Archiv für Ophthalmologie, Vol. LX., Abtheilung V.

⁴Graefe's Archiv für Ophthalmologie, Vol. LXII., Abtheilung III.

⁵Graefe's Archiv für Ophthalmologie, Vol. xv., Abtheilung I.

⁶Studies from the Yale Psychological Laboratory, 1892-1893.

⁷Archiv für die Gesamte Physiologie des Menschen u. der Thiere, Pflueger, 37, 1885.

use of a camera so constructed that after focusing the eye upon the ground glass plate he could remove this plate and place in its stead a diaphragm having a small vertical slit, behind which slit there was passed a roll of photographic film, operated by clock-work, very much as the film in the ordinary hand-camera is rolled from one spool to another. As the pupil is black when its picture is focused on the sensitive paper no image is photographed, but each contraction of the pupil makes the vertical slit smaller from above downwards and each dilation makes the vertical slit wider from above downwards, thus varying the width of the band photographed on the paper as it passes behind the slit. By this contrivance "photograms" are produced which show not only the number of variations in the size of the pupil, but also their degree with an exactness which had been impossible before.

These various methods are mentioned, and the list might be extended almost indefinitely by citing other investigations, in order to show what has been the aim of work in this direction and also how little it is adapted to the needs of the working ophthalmologist. For this reason, especially, it seems warrantable to call attention to a modification of a principle which, though mentioned last, is not the latest chronologically. By this method a magnifying glass is placed before the eye, thus giving a better view of each variation in the size of the pupil and a graduated scale is interposed between the magnifying glass and the observer. The simplest form of this is shown in such crude instruments as were proposed by Carl Ferge and others.

Gradually this became more perfect. Of late the scale has been adapted to a large horizontal microscope which is here presented, which furnishes us with as convenient and complete a pupillometer as has yet been found. In going over the literature of the subject, I find that in 1882 Schadow,⁸ of Crefeld, published an article on the physiological movements of the iris, in which he mentions the use of an instrument constructed somewhat on this principle, and says that Prof. Colrausch, of Wuerzburg, has already constructed the pupillometer on the same principle in 1879. In the description which follows, however, it is evident that neither the instrument used by Colrausch nor that employed by Schadow are as exact or reliable as is

⁸Graefe's Archiv für Ophthalmologie, Vol. xxviii., Abtheilung III.

the pupillometer to which I would call attention. This instrument, which was devised by Mr. Henry L. DeZeng, of Buffalo, was described as a whole in the *New York Medical Journal* of June 17th, and in that description mention was made incidentally of its use as a pupillometer.

It seems worth while, however, thus to call more special attention to its evident advantages in this respect. For use as a pupillometer it is only necessary to place in the tube a micrometer scale similar in principle to the ordinary micrometer eye-piece of the microscope. With this each variation of the iris is not only magnified, but the degree can be measured simply and easily. In order to obtain the best results it is well to have the patient rest the chin in his hands, the elbows in turn resting on the table. Even this position is sufficient to hold the head quite firmly.

Still better, however, is it when a firm upright bar is made fast to a table by a set-screw, the upper part of the bar bearing a head-rest against which the forehead can be brought, while a piece of wood, supported in a convenient place for the teeth, is held firmly in the mouth by the patient, this being the same principle as that utilized by Stevens in his tropometer.

Such a microscope, with the micrometer eye-piece and with a good head-rest, enables an observer with ease and accuracy to measure not only the size, but the movements of the pupil, in such a manner as to be of real clinical value.

A CASE OF EMBOLUS OF A BRANCH OF THE CENTRAL RETINAL ARTERY.

BY B. L. MILLIKIN, M.D., CLEVELAND, OHIO.

PROFESSOR OF OPHTHALMOLOGY, MEDICAL DEPARTMENT, WESTERN RESERVE
UNIVERSITY—OPHTHALMIC SURGEON TO LAKESIDE HOSPITAL—
CONSULTING OPHTHALMOLOGIST TO CHARITY HOSPITAL,
CLEVELAND, OHIO.

ON August 23, 1897, Mrs. G. J., 30 years of age, came to my office with the following history: On the evening of the 19th, four days previously, she had noticed a peculiar, odd feeling in the eyes, as she described it, with some blurring and a considerably diminished vision lasting up to the time of

her visit. I was unable to elicit anything more definite as to the attack by further inquiry. There had been no pain or other discomfort. The difficulty was confined to the left eye. There was no history of previous trouble with her eyes and she had always been able to see well and to use the eyes with entire comfort. There was no history of headache. On examination I found that the vision in O. D.= $\frac{6}{VI}$; O. S.= $\frac{6}{LX}$. Javal's ophthalmometer showed only a very low degree of astigmatism in either eye. Examination with the ophthalmoscope showed the fundus of the right eye normal and about emmetropic. In the left eye the media were entirely clear, the disc was of moderate size, there was a slight pigment ring with pigment crescent outward, a central physiological cup, venous pulse, some striations, the vessels were of good size, and the eye was about emmetropic. Extending from the disc outwardly beyond the macula was a long narrow area of paleness, about a disc diameter in width, the lower margin being just above the macula. With the pupil dilated this pale area showed very distinctly extending a considerable distance beyond the macula toward the temporal region, gradually fading into the normal retinal color. Extending from about the center of the disc outward through the middle of this pale area was a small branch of the central retinal artery. In this vessel just inside of the disc margin was a spot of obliteration, the vessel beyond this, however, being only slightly smaller than the portion on the disc side. It was extremely difficult to determine the origin of this lateral vessel, as it seemed to come directly from behind the superior temporal branch. Just beyond the edge of the disc this vessel was looped backward and partly concealed in the hazy swollen tissue of the retina, but further on it became clear. The upper margin of the pale area was clearly defined and was not apparently limited by any vessel, while the lower margin was limited by the small terminal branches of the superior retinal vein above the macula. Portions of the retina close to these small venous branches seemed to be much darker than the intervening spaces, giving much the appearance of the fingers of a glove, the vessels corresponding to the spaces between the fingers. It seemed to me that there could be no question that the small obstruction in this region was an embolus, as it was perfectly distinct and there was no difficulty in making out its character. The embolus was seen by Dr. Bruner, who agreed with me as to

the character of the obstruction. The field, taken upon the McHardy perimeter, indicated the peripheral portion of the field normal, both objective and for color. There was, however, in the central portion a large complete scotoma, extending from the fixation point downward 10 degrees, downward and inward 20 degrees, inward and slightly downward 15 degrees, outward about 5 degrees, the scotoma being entirely below the fixation point and most extensive in the lower nasal direction. On the 24th, four days after the previous examination, the ophthalmoscope showed that the obstruction in the artery had entirely disappeared, leaving the vessel of fairly good size through its entire length, only the loop was still partially concealed in the swollen retina. The general paleness of the retina remained about the same, both as to intensity and extent. At this time the patient was referred to Dr. E. F. Cushing for an examination as to her general condition. A note from him indicates that "there was no cardiac disease, the pulse was perhaps of rather high tension, but there was no other evidence of arterio-sclerosis." There was also no history of other trouble so far as could be ascertained.

On the 3rd of September following, another examination showed that the vision had improved to $\frac{6}{xviii}$. The caliber of the vessel previously referred to was slightly diminished in size and the pale area in the retina had perceptibly diminished both in extent and in the intensity of the pallor. The field, however, taken at this time, showed no diminution of the scotoma. The patient was next seen on the 10th of September, when there was unquestionably a diminished caliber of the artery through its entire course, but ophthalmoscopically there seemed to be no special change in the fundus and the vision remained the same as noted above. The patient was last seen on October 13, 1898. The vision at that time was $\frac{6}{xxx}$ and the ophthalmoscopic condition had not materially changed nor was there any diminution in the size of the scotoma. There was a slight granular condition of the macular and peri-macular region and still some paleness remaining in the area of the retina previously affected. So far as close reading was concerned she could not read ordinary-sized print on account of the scotoma. She stated that in April, 1898, she had noticed a small tumor in the left breast, which had been removed, and her surgeon reports that the growth was an adenoma.

It will be noted that in a year's time, while the embolus, which was in view, had disappeared promptly, there remained a damage of the entire area of the retina which was first involved, the scotoma remained complete and of the same size during this period, while the general paleness of the area materially diminished but did not entirely pass away. It seems almost incredible that an embolus of this small branch should have produced so marked a disturbance and that on its disappearance the symptoms should not subside. As a rule, an embolus of the central retinal artery produces a very much more extensive area of paleness with the characteristic cherry-red appearance of the macula, both of which in this case were absent, only a narrow portion of the retina being involved. This condition, together with the absence of any atrophic changes in the disc, would indicate that there was not an embolus of the central retinal artery but of the temporal branch above indicated. An interesting fact in this connection also is that the symptoms and damage done to a certain portion of the retina are not necessarily relieved by the disappearance of the embolus itself and by the partial restoration of the function of the arterial branch. Whether the injury to the tissues remains as a result of the inflammatory action which is set up by the embolus or whether an embolus of another small branch supplying this area may have occurred it is impossible to say. One would certainly suppose that the disappearance, ophthalmoscopically, of the embolus would effect a much more marked change in the area of the scotoma than was present in this case, especially as there was a decided diminution in the area of paleness as well as in the intense pallor over the entire retinal portion involved. As to treatment, very little was attempted in this case other than some massage of the eyeball which the patient was directed to follow out.

I have deemed the case one worthy of record on account of the ophthalmoscopic presence of the embolus which was perfectly manifest, because of its disappearance in a day or two and on account of the permanent injury which has remained with no appreciable diminution in the size of the scotoma.

A CASE OF TUBERCULOSIS OF THE CONJUNCTIVA.

BY F. L. HENDERSON, M.D., ST. LOUIS, MO.

IN April, 1898, Mrs. H., 56 years of age, noticed a slight discharge of pus from the right eye. At the same time the upper lid seemed thickened. The attention of her family physician was called to this and, upon everting the lid, he found in the center of the palpebral conjunctiva a small discharging sinus which appeared to be nothing more than the opening of a Meibomian cyst. He prescribed an antiseptic collyrium which was of no avail, the small point gradually developing into an open ulcer. About the 1st of September the patient consulted an oculist and received the following treatment: "The application once a day of a solution of nitrate of silver (gr. j to ʒj) followed by a wash consisting of a solution of borax (gr. x to ʒj)." After treatment had been regularly administered for a month and since, in spite of it, the eye was slowly getting worse, the patient consulted me. Two days before I was called, Mrs. H. had accidentally fractured the neck of the left femur and I found her on her back with the leg suspended. The right eyelid presented some swelling and ptosis. Upon everting it, a deep umbilicated ulcer was found occupying the palpebral conjunctiva, midway between the outer and inner canthus. It was shaped like a horse-shoe, the open end extending back into the fornix, the toe or round end coming within about 3 mm. of the lid border. It was about 5 mm. wide. The bottom of the ulcer was grayish in color and was filled with pus. The raised border of the ulcer was granular and bled freely if touched. Where the palpebral conjunctiva was free from the ulcer it was thick, velvety, and of a deep red. In all other respects the eye was normal and the left eye seemed entirely so. The pre-auricular and cervical glands of the right side were significantly enlarged, being round and hard. I also got a history of a daily rise in temperature covering the past few months. This fever had been looked upon and treated as malaria.

For a few days I applied a 2 per cent. solution of nitrate of silver with no result except that it greatly augmented the patient's discomfort. I then ordered frequent cleansing with a 1 to 5000 bichloride of mercury solution and proceeded to

make a microscopical examination. Dr. Carl Fisch, of this city, took a small piece from the border of the ulcer and also prepared two smear-specimens from the pus found in the inner canthus. He reported: "There were giant-cells to be seen in the granuloma as well as a small tubercle. With proper staining methods tubercle bacilli could be demonstrated. The pus removed from the inner canthus, too, contained a small number of tubercle bacilli." We also found bacilli in the patient's sputum. I reported these results of the examination to the family physician and also to the surgeon who was attending the fractured femur. Both of them scorned my diagnosis. As soon as I could get the permission of the surgeon I operated on the eyelid.

On October 28th, I curetted the ulcer and then cauterized it with lunar caustic. The next day I cleansed off the eschar and packed the wound with finely-powdered iodoform. I kept up this dressing for four days but had to discontinue it owing to the intense congestion of the ocular conjunctiva and to the fact that the cornea was almost entirely denuded of its epithelium. I then ordered hot fomentations four times a day and frequent cleansing with a solution of bichloride of mercury 1 to 8000. In a little over a week after the curetting a small, firm cicatrix occupied the site of the ulcer. I saw her shortly before her death, which occurred five months after my operation, and the almost imperceptible scar in the conjunctiva was still firm. She died of tuberculosis of the lungs.

Norris says: "Tuberculosis of the conjunctiva, always a rare disease, is seldom seen in this country." Thompson says: "I have never seen a case which was proved to be tubercular by bacterial investigation." Fuchs, de Schweinitz, Norris and Oliver, and Noyes all agree that the disease occurs almost without exception in young subjects.

I would also call attention to the fact that the majority of works on ophthalmology discuss lupus and tuberculosis of the conjunctiva under separate heads, without giving any definite point of differentiation, except that the former is generally an extension of a process which begins in the skin. If they are separate conditions a more distinct differentiation should be made. If they are in reality the same disease, there is no use in describing the disease twice. The case cited is also of interest because an early microscopical examination of the ulcer

might have revealed the existing constitutional condition before the physical signs pointed to it and possibly before the disease had reached the incurable stage.

INTROVERSION OF THE IRIS.*

BY L. W. BEARDSLEY, M.D., ST. LOUIS, MO.

THIS interesting condition, described by various authors as sinking-in, collapse, and retroflexion of the iris, was first described by Schmidt¹ in 1804. Since then, von Ammon,² Förster,³ Passauer,⁴ De Wecker,⁵ Samelson,⁶ Taylor,⁷ Parisotti,⁸ Praun,⁹ and Eales and White,¹⁰ have described cases of either the partial or complete variety, with or without dislocation of the lens.

The commonest etiological factor is a contusion, and more especially a contusion caused by a bullet which does not pierce but glances off from the eye. The condition is also seen after operative measures.

Those who have been so fortunate as to secure the affected eye for examination have found that the iris is turned inward, either in part or entirely, the introverted portion lying backward upon the ciliary body, and is invisible. The cases in which there is but partial introversion are rather more frequent than those of the total variety, which is very rare. There is oftentimes an accompanying dislocation of the lens, and nearly always hæmorrhage into the aqueous and vitreous chambers. This hæmorrhage, if profuse, interferes with the proper examination for some time, and we are unable to judge with positiveness what confronts us.

As to the mechanics, there is a variance of opinion, with no clear ideas advanced, and no definite results attained as to finding out how it occurs. Von Ammon says, in referring to his case, "How did it occur? Surely, only by means of the combined concussion of the vitreous body, together with the dislocation of the lens upward, thereby depriving the iris of the

*Read at the twenty-fifth annual meeting of the Mississippi Valley Medical Association, Chicago, Ill., October 6, 1899.

fixed support which the lens provides, permitting it to sink inward. At this moment the return of the vitreous body, followed by the lens, acts upon the iris, preventing its return to the normal position." Förster, however, holds that the pressure of the aqueous upon the periphery of the iris where it is least supported, everts it. As Praun contends, this would necessarily imply a paretic condition of the iris, or there would be a tearing of the sphincter. As this is but infrequently the case, Förster's theory will not apply in all cases. Indeed, after careful weighing, I find there is no satisfactory solution to the problem. That intorsion occurs has been proven by the anatomic researches of various observers, but how it is caused is still an enigma. At least the concussion theory alone will not suffice, for it is sometimes seen after opening the anterior chamber in various operative procedures.

In a case which came under my observation not long since, there were several points of sufficient interest, I believe, to warrant my bringing it before your notice. The history is as follows:

On July 7, 1898, Jno. C., laborer, 34 years of age, was sent to me by Dr. Shanklin, of our city, with the history of having been kicked in the right eye by his three-and-a-half-year-old son, on the fourth day preceding. Upon examination, I found the following state of affairs present: There was a recent scar in the cornea about 3 m.m. long, located about 2 m.m. from the limbus in the upper portion. There were a number of floating opacities in the anterior chamber, of a dark color, like those seen after hæmorrhage. The evidences of irido-cyclitic irritation were quite marked. With the ophthalmoscope I could determine the presence of innumerable opacities in vitreo. These proved afterwards to be partly hæmorrhagic, partly broken up lens matter. There was absolutely no iris visible, nor could any of the ciliary processes be seen, either with the naked eye, or ophthalmoscope. The patient was an illiterate, and with the dots could see $\frac{6}{xv}$ with the normal eye. Vision in the affected eye was reduced to hand movements at 1 meter. I used atropine ointment and applied a compress bandage, which was discontinued on the third day, and a solution of atropine given for home use, in conjunction with hot fomentations. There was a gradual recession of the inflammatory process, and when the opacities had become sufficiently absorbed

I could determine the aphakia. After quiescence resulted, patient could see $\frac{6}{xxiv}$ (dots) with a plus 12.0 spherical lens. A recent examination shows that patient can see $\frac{6}{xv}$ with +12.0 sph., and reads Snellen No. I. with +15.0 sph.

The features of especial interest in the case were the total introversion of the iris, the absorption of the lens in a patient of his age, and the good vision remaining after so severe an injury.

Another case, for the notes of which I am indebted to Dr. C. Barck,¹¹ and which I had the pleasure of seeing through his courtesy, was as follows:

Jno. S., a laborer, of Polish birth, 69 years of age, was violently struck in the right eye with a stone on September 29, 1896. Patient presented himself a few days later. There was no external wound or cicatrix either in the cornea or the sclera. A small amount of blood was present in the anterior chamber. No trace of the iris was visible. The lens was dislocated downward into the vitreous, which was clouded. The fundus was just visible. V. = about $\frac{6}{L}$ with +12.0 sph. As patient's surroundings were very bad, and he declined to go to the hospital, upon which Dr. Barck insisted, the case was lost sight of.

LITERATURE.

¹J. A. Schmidt—Schmidt und Himly's Oph., Bd. III., p. 171.

²Von Ammon—Arch. f. Ophth., I., 6, p. 119.

³Förster—Heidelberg. Berichte, 1887.

⁴Passauer—Arch. f. Ophth., XIX., 2, p. 315.

⁵DeWecker—Graefe-Saemisch Handb., IV, p. 538.

⁶Samelson—Brit. Med. Jour., September, 1872.

⁷Taylor—Lancet, II., p. 839.

⁸Parisotti—Boll. dell'Acad. Med. di Roma, XVIII., p. 602.

⁹Praun—Handbuch, 1899, p. 275.

¹⁰Eales and White—Lancet, 3963, p. 412.

¹¹C. Barck—Personal Communication.

MEDICAL SOCIETIES.

FROM THE NINTH INTERNATIONAL OPHTHALMOLOGICAL CONGRESS.

BY CHARLES BARCK, M.D., ST. LOUIS, MO.*

The Ninth International Congress of Ophthalmology, held at Utrecht, August 14-18, 1899, was formally opened by Prof. Snellen, Sr., his imposing figure being familiar to all present. It was one of the last acts in his university career, as he intends resigning from his chair on account of advanced age. His eldest son will no doubt be chosen as his successor. (Has since been done).

In his opening address, Snellen paid due tribute to Holland's famous physicians, to whom ophthalmology owes so much—Boerhaave, in the eighteenth, and the lamented Donders in our century, whose demise occurred just previous to the last Congress at Edinburgh. "To the land of Donders," had been the unanimous cry when the question as to the next place of meeting came up.

He then mentioned, with perceptible emotion, the loss which ophthalmology had suffered in the death of Helmholtz. "Let us repeat the words with which Donders addressed that immortal mentor when he presented the first von Graefe medal at Heidelberg: 'To the founder of a new science, to the benefactor of mankind.'"

The Congress was well attended, there being about 400 members present; the different countries were nearly equally represented, the United States having sent at least two dozen, amongst them some of her best known, oculists.

At this Congress an innovation was made which proved anything but satisfactory, namely, the division into three sections—A, anatomy and physiology; B, optics, and C, pathology

*Dr. Barck has kindly promised us a more detailed report at a future date.

and therapeutics. The three sections convened at the same time in different rooms of the University. One of them, the Aula, a former chapel, was large enough, the others proving inadequate. On account of this division, it was naturally impossible to hear all the papers, as at previous congresses, and, furthermore, by trying to select the ones most valuable individually, valuable time was lost in running to and fro. It was the universal sentiment that this was an impracticable arrangement and everywhere the hope was expressed that it would be rectified at the next Congress.

The following papers were read :

SECTION A.

H. Einthoven—Geometric Optical Illusions.

J. P. Nuël—The Channels in the Anterior Chamber for Eliminating the Aqueous Humor.

F. Benoit—Eliminating Channels at the Posterior Pole.

E. Landolt—A New Stereoscope.

E. Treacher Collins—Anatomical and Congenital Defects of the Ligamentum Pectinatum.

M. E. Mulder—Pathologic Anatomical Demonstrations.

Ole Bull—(1) Drawings and Chromatic Tables. (2) Changes in the Retinal Blood-vessels.

F. Dimmer—Photographing the Fundus.

L. Dor—Projection of Photographs from Nature in Colors.

Th. Axenfeld—Pathologic Anatomical Demonstration.

J. Mackenzie Davidson—Localizing Foreign Bodies in the Eye by *X*-Rays.

K. Grossmann—Localization of Foreign Bodies in the Eye by *X*-Rays.

J. von Michel—Pathological Changes in the Ocular Blood-vessels.

A. Siegrist—Arterio-Sclerosis of the Ocular Blood-vessels.

S. Theobald—A Case of Detachment of the Retina, with Complete Re-attachment and Restoration of Vision.

D. Goldzieher—Iritis Glaucomatosa.

C. Nicolai—The Tension of the Tissues of the Eye.

W. Schoen—The Three Essential Anatomical Changes of the Glaucoma Process.

Bietti and Axenfeld—Nerve Degeneration After Neurectomia Optico-Ciliaris and Anterior Ciliary Nerves.

- E. de Gross—Keratitis Neuroparalytica.
 E. Kruckmann—Does a Primary Cancer Occur in the Eye?
 E. Frank—Pathological Anatomy of Ocular Lepra.
 C. Addario—Anatomical and Bacteriological Researches
 Concerning Conjunctivitis Trachomatosa.
 R. Hitschmann—The Pathogenesis of Corneal Dermoids,
 Subconjunctival Lipomata and Congenital Coloboma of the
 Lids.
 F. D. A. C. von Moll—Metastatic Conjunctivitis.
 A. Druault—The Colored Rings Seen Around a Flame in
 the Norm and Pathologically.
 E. von Gross—Tabetic Optic Nerve Atrophy.
 F. Heine—(1) Anatomy of the Myopic Cone (Communi-
 cation from Prof. Hess). (2) Contracted and Relaxed Ciliary
 Muscle (Communication from Prof. Hess).
 W. B. Jessop—Glioma Retinæ.
 A. Neuschueler—The Fibers of the Optic Nerve.
 L. Dor—The Nervi Nervorum of the Chiasma.
 E. Pergens—The Retina of *Leuciscus Rutilus* L.
 K. Grossmann—Listing's Law and Palsy of the Muscles
 of the Eye.
 E. Pflueger—(1) New Chart for the Detection of Color-
 Blindness. (2) Proximate Visual Acuity in Myopia of High
 Degree.
 Greef—The Nature of the So-Called Fuchs' Atrophy of
 the Optic Nerve.

SECTION B.

- M. Tscherning—The Accommodative Changes in the Eye.
 Rogman—The Pseudo-accommodation in the Aphakic Eye.
 Pfalz—Perverse Astigmatism.
 S. Holth—(1) Ophthalmometric Studies. (2) Ophthalmo-
 metric Studies on the Eye after Death.
 L. Howe—The Desirability of Greater Exactness in Ex-
 pressing pupillary Reaction.
 Kempner—New Instrument for Studying Hemianopic Pu-
 pillary Reaction.
 L. J. Lans—Pupil Width
 C. Hess—Accommodation and Convergence.
 G. T. Stevens—The Declination of the Vertical Meridians
 of the Retina.

G. J. Bull—Fatigue from Trying to Maintain Binocular Single Vision.

A. Bielschowsky—Vision of Strabotics.

Pfalz—Influence of Exact Correction in Youth on the Development of Myopia.

W. Koster—The Elasticity of the Sclerotic and Its Relation to the Development of Glaucoma.

Uhthoff—Injury to the Eye by Insolation.

H. Zwaardemaker and L. J. Lans—Refractory Aspects of Eye Reflexes.

Silex—Pseudomonochromasia.

E. Sulzer—Color-Perimetry.

F. Ostwalt—Experimental Studies with Periscopic Glasses.

P. de Obarrio—The Best Visual Acuity.

H. Coppez—Action of Certain Toxins on the Cornea.

O. Neustätter—(1) The Shadows in Skiascopy. (2) Phantom for Skiascopy.

E. Landoldt—Reform in Numbering Prisms.

Ch. H. May—Standard for Measuring the Field of Vision.

F. Schieck—The Primary Changes in Ribbon-Keratitis.

W. Thorner—A New Ophthalmoscope Giving an Image Without Reflexes.

SECTION C.

O. Schirmer—Benign Post-Operative Cyclitis.

M. Straub—Hyalitis.

W. Schoen—Scleritis and Its Connection with Myopia.

O. Haab—Intraocular Disinfection.

H. Dor—Treatment of Retinal Detachment.

E. Motais—New Operation for Ptosis.

H. Sattler—Iron-Cataract.

A. von Hippel—The Lasting Effects of Myopia Operation.

A. Critchett—Operative Treatment of Conical Cornea.

G. A. Berry—Operations for Conical Cornea.

E. Clark—Union of Corneal Wounds.

R. Sattler—(1) Ocular Manifestations of Hyperostosis Cranii. (2) Uncommon Orbital and Ocular Expressions of Maxillary Sinus Disease.

V. Morax—Toxins Producing Conjunctival Inflammation.

Jocqs—Methods to Render the Lens Quickly and Completely Dim Without Tearing the Capsule.

J. Hern—Operative Treatment of Glaucoma.

Valude—Bactericidal Action of the Tears. Prophylaxis and Treatment of Operative Infection.

Rohmer—Post-Operative Treatment of Cataract.

T. Dianoux—Treatment of Corneal Infiltration by Injections of Ocean Salt-Water.

Darier—Ocular Massage, Corneal Massage, Vibratory Massage, Massage Pressure, and Its Action on the Accommodation and Refraction.

Lapersonne—Optic Neuritis Dependent on Sinusitis and Diseases of the Posterior Part of the Nasal Fossæ.

H. Coppez—Treatment of Granulations by Electrolysis.

J. M. Ball—Removal of Cervical Ganglion for Glaucoma.

A. Emrys Jones—The Treatment of Some Complicated Cases of Closed Pupil.

G. Guttman—Treatment of Complicated cataract.

H. Knapp—Some Rare Tumors of the Orbit.

B. Wickerkiewicz—New Operation for Epicanthus.

E. Böckmann—Pannus Trachomatous and Its Treatment by Periectomy.

A. Bronner—Sixty Cases of Extraction of Senile Cataract Without Iridectomy.

Darier—Treatment of Conjunctivitis with the Different Silver-Salts.

O. Neustaetter—Washing the Nasal Duct from the Puncta Without Cutting or Stretching.

W. Schoen—Changes Caused in the Infantile Eye by Spasms.

J. Lavage—Treatment of Congenital Nystagmus.

PAMPHLETS RECEIVED.

"A New Model of a Small Ophthalmoscope," by W. L. Pyle, M.D.

"Unilateral Albuminuric Retinitis, with Report of a Case," by W. L. Pyle, M.D.

"Simple Methods of Photographing with the Microscope," by B. A. Randall, M.D.

"Involvement of the Eye and Ear in Cerebro-Spinal Meningitis," by W. Cheatham, M.D.

A DISCUSSION ON THE PATHOLOGICAL SIGNIFICANCE OF SYMPATHETIC IRRITATION, AND ITS CONNECTION, IF ANY, WITH SYMPATHETIC OPHTHALMITIS.

HELD IN THE SECTION OF OPHTHALMOLOGY OF THE BRITISH MEDICAL ASSOCIATION AT ITS SIXTY-SEVENTH ANNUAL MEETING.

I.—F. RICHARDSON CROSS, M.B., F.R.C.S.,

Ophthalmic Surgeon, Bristol Royal Infirmary.

The consideration and discussion of the "Pathological Significance of Sympathetic Irritation," pure and simple, would prove, I think, a matter of considerable difficulty for any of us; but taken in connection with, or in contrast to "Sympathetic Ophthalmitis," the subject is widened and simplified.

I felt great hesitation in accepting the honor of opening this debate. I have but few facts to bring forward with regard to it, and must be content if I can suggest some lines of thought that may be elaborated by some of my distinguished auditors.

An eye that has been injured, either by an accident or through an operation, is frequently associated after a longer or shorter period of time with symptoms of discomfort, or of inflammation in its fellow, the affection in the second eye depending upon the close functional and anatomical association of the organs of sight. Nowhere else in the body are these conditions at all analogous.

The sense organs for taste and smell are practically central and single, and each ear appears to be entirely separated from its fellow, but the intercommunication of the two eyes is most complete, whether we consider the psychical or physiological arrangement and control of the visual nerve tracts, the intercourse of the blood vessels and lymphatics, or the close binocular correlation which constitutes perfect sight, all of which must be to some extent interfered with by any imperfection of either eye.

The word "irritation" was formerly applied to all conditions of the sympathizing eye. Next the term "sympathetic ophthalmia" was introduced. But of recent years a distinct

separation has been made between cases of inflammation "ophthalmitis," and of irritation "neurosis."

The separation depends almost entirely upon the character of the symptoms which are present in the sympathizing eye, and they can be classified under the two separate headings, respectively, of functional and inflammatory.

The functional subjective disturbances typical of sympathetic irritation are weariness of the eye and disinclination for use, uneasiness, tenderness, or pain in the eye or orbital region; blepharospasm, lachrymation, and hyperæmia of the conjunctiva, photophobia, *muscæ*, and photopsia; dizziness or fog-giness of sight; obscurations of longer or shorter duration; transient defects in the visual field, or even temporary blindness; spasm or weakness of accommodation, or abnormal pupil action. A slight redness or haze of the optic papilla may be present, but careful examination of the eye fails to detect any signs of intraocular inflammation.

The objective symptoms of "ophthalmitis" are those of definite inflammation. They are peculiar and almost typical, and usually early implicate the uveal tissues. Impaired function of the pupil is accompanied by iritis, keratitis punctata, and ciliary congestion. The iridocyclitis, usually of a mild, serous type, and at first causing the patient but little discomfort, insidiously implicates the whole uvea, and gives rise to synechiæ of the pupil and to vitreous opacities. Leber is of opinion that the optic nerve is the part first affected, but it is not easy to prove this by clinical observation. Papillitis seems to be absent in many early, well-marked cases of sympathetic uveitis, but, on the other hand, it is often present, sometimes as neuro-retinitis, or even with retinal hæmorrhage or œdema.

The purely "functional" symptoms of irritation compared with the definite "organic" defects present in sympathetic ophthalmitis render the diagnosis between them easy in typical cases, but clinically the two sometimes overlap one another. Cases occasionally present themselves in which doubtful signs of neuritis or of iritis suggest that an irritated eyeball is being threatened with the more serious inflammatory form of sympathetic mischief.

Again, cloudiness of vision affecting the sound eye after an injury to its fellow may be merely a symptom of irritation; but the optic disc should be carefully examined, for slight neu-

ritis may be present without other organic symptoms as the forerunner of a distinctive inflammatory attack.

As illustrative cases, I may mention the classical one of Donders, where a small fragment set up the most severe irritation in the good eye a few weeks after its fellow had been blinded by accident. The pain was intense, and the eye so irritable that for two years the patient could make no use of it, and believed himself to be blind. But in two hours after removal of the exciter it could be fairly well used, and examined accurately as to sight and absence of organic mischief, and it completely recovered.

Lawson¹ gives notes of sympathetic irritation coming on seven months after an injury. Injured eye removed. Complete recovery, and good sight for nearly nine years; then sympathetic inflammation and loss of sight.

I recently saw what seems a typical case of irritation possibly predisposed by some nervous affection, A. S., 44 years of age, who was formerly a porter in a warehouse, but for the past seven years has been unable to work owing to spinal disease. He said that for some time he had been in a nervous excited condition, often waking up at night, and unable to keep quiet in bed. The knee-jerk was somewhat diminished.

While the patient was cutting a stick, at 4 years of age (forty years previously) the knife slipped and wounded his left eye. The wound healed well, and this eye, although blind and somewhat shrunken, has remained quiet ever since.

His right eye was perfectly well until four years ago. Since then the patient has complained of photophobia, recurrent obscurations, lachrymation, and occasional slight conjunctival discharge. He says that the sight is at times quite clear, but at other times so cloudy that he can not see anyone across the street. When this eye is well he can read continuously for almost an hour, but when it is irritable he can not do so for more than a few minutes at a time, owing chiefly to a mistiness which comes over the center of the field, while the periphery remains comparatively clear. The right eye shows no signs of inflammation, no iritis, and no impairment of accommodation, but there is some doubtful haze over the optic nerve. The pupil reacts well to light and distance. Vision $\frac{6}{VI}$, J. I at 8 to

¹Royal London Ophthalmic Hospital Reports, Vol. X.

15 inches; with — .50 $\frac{6}{v}$. The left eye is a shrunken stump, probably containing ossifying choroid. Enucleation was advised, but has not yet been accepted.

The patient only paid me one visit, and the actual form of his nervous affection was not fully worked out.

We can not with certainty foretell what kind of damaged eye may give rise to sympathetic mischief, or what one is perfectly free from risk of causing such complication. The exciting eye may be quiet, or may be irritable, or inflamed, when it gives rise to inflammation, or merely to irritation in the sympathizing one.

We know that where sympathizing ophthalmitis proper has occurred some kind of perforating lesion of the exciting eye has been present in nearly every case on record, and that any report to the contrary would be received with caution. It is true that exceptions are found in cases that have been published of "sympathetic ophthalmia" occurring without any visible external wound in the injured eye. In some of these an inflammation of the uvea (iridochoroiditis or cyclitis) has attacked the second eye, at an interval after the first, by reason of a diathetic or other cause common to both, and without any sympathetic connection between the two. In others the lesion has been a subconjunctival rupture of the sclera, caused by a blow. In the majority of cases in this group the sympathizing eye has suffered merely from irritation, but at least seven cases are recorded by reliable observers where definite ophthalmitis resulted, although no rupture through the conjunctiva could be found. Even if we overlook the possibility of small conjunctival wounds escaping observation, are these cases really exceptional? It seems to me doubtful how far a bruised conjunctiva is a reliable protection for the damaged contents of a ruptured eyeball against infection from without. Again, it is possible for organisms to enter an uninjured eyeball from the blood stream, and to cause various well-recognized forms of inflammation in connection with general diseases. Berlin and Hutchinson think that sympathetic eye diseases may be started by affected particles from the exciter circulating in the blood stream, and producing characteristic sympathetic symptoms as soon as they reach and develop in the congenial soil of the opposite uvea.

The original damage in some typical cases of sympathetic

ophthalmitis may be very slight, as for instance a simple intra-ocular operation. Extraction of cataract, or a needling after cataract extraction, has caused it. In many of these cases iritis had complicated the operation, but in some the operated eyes seemed to be quite free of any inflammation throughout, and in a few the sight in them continued to be good, although the removal of the sympathizer was rendered necessary on account of pain or degenerative changes.

Sympathetic irritation also follows punctured wounds; it may soon cease, or may recur from time to time for years without any further complication. It may be relieved by the removal of the exciting eye, or eventually be succeeded by an ophthalmitis. But more usually irritation is caused by old shrunken eyes, particularly if containing painful or ossifying choroid, etc. The irritation of glass eyes in the socket may bring it on. But it is important to recognize that all these conditions may also be productive of ophthalmitis.

Thus several cases are quoted in the reports of Nettleship and of the Ophthalmological Society Committee² where a glass eye has been the cause of sympathetic ophthalmitis, whether worn over a shrunken eyeball, No. 183 (where neuroretinitis and later iridochoroiditis occurred in the sympathizer, which was lost fourteen years after the destruction of its fellow by corneal ulceration) or after enucleation of the eyeball, No. 199 (where glass eyes had been worn in comfort for fifteen years, but a new one set up conjunctival trouble and then plastic iritis, which recovered after about three months).

A shrunken eyeball seems able to excite ophthalmitis when it is quite quiet and apparently devoid of any microscopical evidence of inflammation, or it may have previously become ulcerated or irritable.

Even the optic nerve stump, left after enucleation of an eyeball, may become involved in cicatricial bands or worried in some way so as to cause a sympathetic ophthalmitis (No. 191) in one case, or a sympathetic neuritis in another case, both relieved by further operations on the faulty stumps.

Nor can we be certain as to the length of interval which will separate the injury to the exciting eye from the sympathetic complication whether this be functional or organic.

²Transactions, Vol. VI

A common period for the development of sympathetic ophthalmitis is two or three months, but many cases commence in two or three weeks, or even earlier. A man came under my notice with well-marked right sympathetic iridochoroiditis. Two years previously he had wounded his left eye with a nail. The right became at once very irritable; he says it was inflamed on the second day. On the seventh day after the accident the left eye was removed by Mr. George Lawson (the right being then very bad and much inflamed), evidently without arresting the sympathetic disease.

On the other hand, out of the 211 cases of ophthalmitis published by the Ophthalmological Society Committee,³ twelve eyes became inflamed as late as twenty years after the injury, the interval in three cases being no less than thirty-seven, thirty-eight, and thirty-nine years respectively.

In sympathetic irritation the period of interval varies just as much. It may be short or very long, so that if we believe these cases to be really sympathetic in their nature, and that they would not have occurred if the damaged eyeball had been earlier removed, we can not feel absolutely safe at any period, nor can we say for certain what the character of the sympathetic mischief will be by the interval which separates it from the original injury. A comparison, however, of the proportional number of cases occurring at different periods would seem to show that typical uncomplicated irritation is much more likely than inflammation to occur after a prolonged interval. Thus, among the cases of which I have record, inflammation set in within the first year in 16 out of 23, while within the same period irritation had developed in only 10 out of 27. In other words, within the first year inflammation was proportionally almost twice as frequent as irritation. Many slight cases of the latter, however, pass unnoticed. Others recur and extend into very lengthened periods after the original injury, while ophthalmitis has one definite commencement, and once established is continuous and nearly always progressively destructive, so that deductions in this direction are not reliable.

The theories used to explain the occurrence either of sympathetic ophthalmitis or of irritation remain suggestive but proven. To speak of one group as a reflex neurosis and of the

³Ibid.

other as a migrating ophthalmia or septic uveitis has done good service as a working hypothesis, but we are still uncertain along what channels either the nerve currents or the infecting particles may pass, or what special kind of organisms may be concerned in the disorder.

Leber found hyperplasia of the optic nerve in nine cases of sympathetic ophthalmitis, and believed the disorder to be always due to septic inflammation, and that the first symptom in the sympathizing eye was neuritis and not iritis. Snellen has also shown the presence of lymphoid cells around the optic nerve,⁴ and Brailey fully describes the microscopical appearances of the cellular infiltration in the affected uvea, in many sympathizing eyeballs. He found a similar condition existing in the exciter, if removed while it was still inflamed, but he has seen many cases of undoubted sympathetic ophthalmitis, where the first eye, possibly a mere stump at the time of the outbreak, was neither tender nor painful, having long been quiet, and several where such, when examined microscopically, presented, at the most but very doubtful signs of present inflammation.⁵

The various experiments by Deutschmann mark an epoch in the study of the disease. In his hands they have been almost conclusive, but they have scarcely received corroboration. Scarcely any other experimenter, whether by injecting into the eye itself or into the lymphatic channels associated with it, has succeeded in establishing any symmetrical inflammation of the eyes that resembled sympathetic ophthalmitis, and while the presence of cellular infiltration has been shown in the exciting or in the sympathizing eyeball, after its removal, many recent investigators deny that micro-organisms can be found in the tissues, while others admit the presence of organisms, but deny the possibility of experimentally producing sympathetic ophthalmia.

If micro-organisms are the essential factor in the causation of this disease, it must at any rate be admitted that the specific organisms in question have not yet been demonstrated.

Some say that sympathetic ophthalmia never occurs in animals, if this is so we could scarcely expect to produce the

⁴Trans. Internat. Med. Congress, 1881.

⁵Trans. Oph. Soc., Vol. IV.

disease by experiment, and many of the negative results may thus be explained.

Some of the latest observations are those of Angelucci,⁶ who gives results of experiments and bacteriological examinations from three cases of sympathetic ophthalmitis. The removed exciting eyes contained micro-organisms, which in cultures showed pathogenic micrococci. A piece of iris was taken from each of the sympathizing eyes, and showed micro-organisms especially in the perivascular spaces. The cultures showed micrococci which when injected into a rabbit's eye caused iridocyclitis, and infiltration along the optic nerve through the chiasma and down the subvaginal space to the other nerve as far as the eyeball.

None of the animals showed sympathetic symptoms in the second eye; they died of general infection possibly before ophthalmia had time to declare itself. These and other experiments lead him to the opinion (1) that eyes suffering from sympathetic ophthalmitis always contain germs, (2) that these travel from the infected eye along the tissues of the optic nerve to the fellow eye, but (3) he does not believe that sympathetic ophthalmia can be artificially produced in animals, and considers the disease to be peculiar to man.

Bach,⁷ experimenting earlier on the same lines with cultures of various micro-organisms, had obtained absolutely negative results. But by means of chemical or mechanical irritants applied to the surface of the eye he produced at once in the fellow eye fibrinous exudations in the aqueous, vitreous, and subretinal space. These were demonstrated by immediate removal of the eye and subsequent examination under the microscope. He concluded that prolonged irritation of an eye produces vascular dilatation and escape of the blood constituents, not only in it but in the fellow eye also, and that sympathizing ophthalmia is thus initiated by a neurotrophic action of the ciliary nerves rather than by the direct agency of bacterial organisms, the intensity and duration of the irritation being of more importance in causation than the nature of the irritant.

In opposing Bach's views Angelucci brings forward arguments against the existence anywhere of special trophic nerve

⁶Rev. Gén. d'Ophtalmologie, 1898.

⁷Oph. Rev., Vol. XV.

fibers, and considers that the results described are due entirely to vasomotor action, and resemble much more an ordinary hyperæmia than the conditions of definite inflammation that characterize sympathetic ophthalmitis.

Dr. Cecil Shaw⁸ has made a series of experiments on rabbits' eyes to determine what changes, if any, follow prolonged irritation, external or internal. Wounds in the ciliary region were made while purulent conjunctivitis was set up by jequirity, and the conditions were in some cases maintained for several months; no iritis occurred in the wounded eye, nor were any abnormal symptoms produced in the fellow. Wounds with soiled instruments and the introduction of shot into the eye through the sclera or into the ciliary region seemed to produce scarcely any symptoms in the one eye or in the other. After death the eyes were removed and hardened, and the examinations under the microscope both for exudations and organic changes in the eyes, and for the presence of micro-organisms were practically negative.

Sympathetic ophthalmitis is usually caused by wounds or perforations of recent date, particularly in the ciliary region, or complicated with prolapse of the iris, conditions favorable for infection by organisms, but it is certainly rare after severe suppurative inflammation has taken place. Panophthalmitis of the exciter often causes irritation of the fellow, but seldom inflammation.

This fact has been used against the migratory theory, but it is not likely that the pus-producing cocci are those responsible for sympathetic neuritis or uveitis, and indeed the former organisms may be antagonistic to or destructive of the latter. The inflammatory exudation also may seal up the channels of communication in the eye and prevent the transit of micro-organisms. In this connection I may remind you how many cases of fatal cerebral meningitis have occurred after excision of a suppurating eyeball; it would seem as though the operation opened up a passage for the pus organisms from the eye to the brain, possibly along the perivascular lymph spaces or those of the optic nerve, or by means of the cavernous sinus, and this hypothesis is rendered more probable by the fact that closure of the orbit by over-bandaging seems to increase the

⁸British Medical Journal, 1898, Vol. I., p. 1580.

risk of meningitis, while free washing and drainage diminish if they do not entirely remove it. Here as in the case of many of the injection experiments which have been made in order to cause sympathetic ophthalmitis the organisms set up inflammation of the brain, while there is no evidence of the other eye becoming affected. The inflammation of a sympathizing eye is never suppurative.

Cerebral meningitis very rarely results from an injury to the eyeball or as a complication of sympathizing ophthalmitis. Snellen,⁹ however, gives notes of a case of acute meningitis occurring simultaneously with sympathetic ophthalmitis. Microscopic examination of the exciting eye showed the uvea to be infiltrated with lymphoid cells, which were also abundant in the tissue surrounding the optic disc and in the subdural space of the optic nerve. A few other cases have been recorded.

Enucleation of wounded eyeballs in which no inflammation has been present, or even where inflammation has been very slight, has on several occasions been rapidly followed by fatal meningitis. Nettleship seems to think¹⁰ that risk from this cause (excision of eyeballs) is not very materially increased by the presence of suppuration in the eye.

A very few cases have been published of fatal meningitis following intraocular operations. (1) Seven days after a cataract extraction in a woman 70 years of age (Knapp). (2) Four days after needling opaque capsule in a child one year of age (Warlomont). (3) Thirteen days after iridectomy for secondary glaucoma following cataract extraction in a woman 68 years of age.

Very little opportunity is afforded for paying attention to the pathology of sympathetic irritation. The old theory of a "reflex neurosis," which has been deposed by that of "migratory ophthalmia," is now made use of to explain it. The symptoms in many cases are such as might be caused by an afferent irritation from the exciting eye being carried along the ciliary branches to a nerve center, whence the efferent impulses pass to the sympathizing eye. These may cause defective or altered nutritive conditions in the tissues of the eyeball, or a diminished power of resistance to disease.

⁹Trans. Internat. Med. Congress, 1881.

¹⁰Trans. Oph. Soc., Vol. VI.

In other cases, however, the affection would appear to be due to the presence in the sympathizing eye of organisms, capable for the time being of causing an irritation only, but liable at any time later to give rise to a definite inflammation.

We have often observed that a secondary operation on or an injury to an eye that has been damaged or has undergone a former operation, is not devoid of risk. Persistent inflammation of a low type not infrequently results. This may depend upon the *materies morbi* (which had been quiet, or possibly encapsuled, after the earlier wound) becoming active.

Deutschmann¹¹ in some of his earlier injection experiments which were negative considered "that the spores did not excite the inflammatory process by germination, for they remained unaltered and became enclosed in masses of pus corpuscles and young spindle cells. To this encapsulation by which the spores were rendered innocuous he attributed the fact that the sympathetic process may become retrograde."

It is sometimes risky to undertake an improving operation on an injured eyeball of some years' standing not only for the eye itself, but because it may set up serious irritation or even sympathetic ophthalmitis in its fellow. The simple needling of an opaque capsule after cataract extraction has caused such a result.

A permanent damage to the eye seems to be inflicted in some cases of sympathetic irritation. Thus, Brailey¹² quotes 29 cases where enucleation of the exciter was performed to relieve irritation; 16 were cured, while 13 were uninfluenced or rendered worse. If the irritation in these cases was a pure neurosis set up by the injured eye, why were they not all cured by the removal of the cause?

Irritation often continues for years without any inflammation occurring, or it may last only a few days before inflammation follows it. The temporary irritation which seems to culminate in inflammation would appear to be different in its causation from that which occurs independently.

I regret that neither my own personal experience nor what I have been able to gather from the writings of others has en-

¹¹Oph. Rev., II., 23.

¹²Trans Oph. Soc., Vol. IV.

abled me to deal in a more capable manner with the pathological significance of sympathetic irritation.

I have no doubt that a seriously damaged eyeball is prejudicial more or less to its fellow, and may predispose it to various kinds of discomforts, if not diseases, and that those which possess no useful sight should be removed or eviscerated, while a shrunken globe interferes with the safe wearing of a glass eye, and may at any time become a source of danger. A degenerated inflamed eyeball seems likely to make an excellent incubator for micro-organisms, and it is certainly damaging to the general health, which I have often seen materially benefited by its removal. Synechiæ and cicatricial pressure or traction should be, if practicable, relieved; but the rules of conservatism in surgery should not be overstated in order to retain blind and often dangerous eyes. The good practice initiated by Augustin Prichard for the removal of eyeballs in association with sympathetic troubles should be still further extended, and an eye that is neither comely nor useful, which is in any degree a possible source of mischief to its fellow, should be enucleated.

[TO BE CONCLUDED].

A SIGN OF THE TIMES.—The following letter throws a sidelight on the manner in which some oculists gather shekels. If there were no such, no man would have the effrontery to send such a circular letter to the profession:

ST. LOUIS, Mo., September 25, 1899.

DR.....

DEAR SIR: If you will favor me with a portion or all of your prescriptions in my line, I will agree to allow you 50 per cent on the work you send, and will furthermore agree to not charge your patients in excess of legitimate or market prices for the goods they purchase. I make this proposition with a view to advancing our mutual interests, and for my protection against competitors in business who have adopted similar, but unfair methods.

Trusting the above will meet with your approval, and soliciting your patronage and investigation, I remain,

Yours respectfully, S. S. DREIFUS.

NEWS ITEMS.

THE BROMOHYDRATE OF ARECOLINE is a white, crystalline, soluble salt, which when applied to the eye in the form of a one-half or one per cent. aqueous solution causes contraction of the pupil. A one half per cent. solution dropped into the conjunctival sac causes burning and slight conjunctival congestion. In from three to five minutes the pupil begins to contract and reaches its maximum in from ten to fifteen minutes, accompanied by spasm of the ciliary muscle. The maximum effect remains for a quarter of an hour or so, after which the pupil gradually returns to its normal condition, usually in the course of an hour or two. The tension of the normal eye does not seem to be affected by it, but in cases of glaucoma clinical results show this drug to be the equal of eserine. Bietti observed that it appeared to act more promptly and more energetically than eserine, but that its effect was of shorter duration. It keeps well in solution, retaining its active properties unchanged for an unlimited period.

CONCERNING THE IMAGINATION REFLEX OF THE PUPILS OF THE BLIND.—J. Piltz continues his investigations in regard to the imagination reflex of the pupils in cases of blind individuals. The conclusions arrived at are as follows:

1. The pupils of the blind, which by side illumination, do not react to the light, react to central (axial) illumination. From this follows: (*a*) that the pupillary fibers are found principally in the macula lutea and its neighborhood; (*b*) that the pupillary fibers can remain undisturbed in those who are totally blind, whose optic fibers have been totally degenerated for a long time.

2. The pupils of the blind become narrowed when the thought of light takes place (even after atrophy of the retina).

3. The pupils of the blind become wider when the idea of a dark object is in the patient's mind (even when the retina is atrophied).—*Med. Rev.*

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ORIGINAL ARTICLES.

PHYSIOLOGIC VARIATIONS IN THE SIZE OF
MARIOTTE'S BLIND SPOT.*

BY HOWARD F. HANSELL, M.D., PHILADELPHIA, PA.

THE study of Mariotte's blind spot, as apparent from the text-books on physiology and ophthalmology, has never been carried to an exhaustive extent. Indeed, one is struck by two noticeable peculiarities of authors, unfortunately illustrated in other subjects, that the original delineations have been handed down through the successive generations and that these delineations always represent one and the same eye. The principal reason for this neglect would seem to be that the size of the blind spot and its relation with the foveal region are of little practical value in the diagnosis of disease and that its recognition and the knowledge that such a blind spot existed in all human eyes were sufficient. While I am unable to deduce from my analysis of a rather small number of eyes any conclusions that would mark any decided progress in ophthalmology, I have found the examination to be interesting and profitable and have been able to verify, by the projection on the visual field of the limits of the blind spot, the findings that seemed consistent with the ophthalmic appearance of the disc and the state of the refraction. With the valuable co-operation of my friend, Dr. N. D. Pontius, assistant in my service in

*Read before the Ophthalmic Section of the College of Physicians of Philadelphia, October 17, 1899.

the Polyclinic Hospital, who has devoted much time and care to the exact measurements of the blind area in the cases quoted below, I have secured some fields that show points of difference that are worthy of note. Many of the cases were those of the pupil-physicians taking courses in the Polyclinic and assistants connected with the institution, and a few were patients selected on account of their intelligence, therefore the outlines are more nearly accurate than would be obtained were all the cases those of patients in the clinic. The accurate measuring of the fields requires much patience on the part of the examiner and a considerable degree of intelligence and co-operation on the part of the examined. The method adopted was to mark a small black cross on a clear sheet of paper and with a black-pointed pencil, chosen so that it presented a sharp contrast in the shade with the paper, fix the patient's head at exactly 33 cm. distance, and, with the second eye bandaged, the pencil is moved from the seeing field into the blind field, thus making the projection of the disc upon the paper appear at its smallest and probably truest limits. I considered this plan better than first to find the blind spot and to define its limits by moving the pencil-point eccentrically until it passed into the seeing field. By the latter method it was feared that its size would be made unconsciously and involuntarily larger.

I.—EMMETROPIA: 37 INDIVIDUALS, 74 EYES.

Distance from the point of fixation to the center of the blind spot.

Right Eyes: 8.5, 7.7, 9, 8.1, 8.2, 8.5, 8.5, 8.2, 8.2, 8.3, 7.2, 7.3, 7.2, 8, 8, 8, 8, 7.7, 8.5, 6.8, 9, 8, 8, 8.5, 8.3, 8.4, 8, 9, 7, 8.4, 8, 9, 8.7, 8, 8, 8, 8.7.

Left Eyes: 8, 8, 8, 9.1, 8.9, 8, 8.7, 7.8, 8, 9, 8, 7.7, 7.5, 8.5, 7.7, 8, 8.9, 8, 7.9, 7, 9, 7.3, 7.7, 8, 8, 9, 7.7, 8.4, 7.5, 7, 7.5, 8, 7.7, 9, 8, 7.4, 7.7.

In R.E. the longest distance = 9 cm.

In L.E. the longest distance = 9.1 cm.

In R.E. the shortest distance = 6.8 cm.

In L.E. the shortest distance = 7 cm.

The average distance in R.E. = 8.1 cm.

The average distance in L.E. = 8 cm.

II.—HYPEROPIA: 11 INDIVIDUALS, 22 EYES.

Right Eyes: 8.5, 7.8, 7, 7.4, 8, 8.2, 7.5, 9.2, 7.5, 9, 9.3.

Left Eyes: 9.5, 9, 7.5, 7.2, 7.7, 8.7, 8, 8.7, 7.7, 9.5, 9.

In R.E. the longest distance = 9.3 cm.

In L.E. the longest distance = 9.5 cm.

In R.E. the shortest distance = 7 cm.

In L.E. the shortest distance = 7.2 cm.

The average distance in R.E. = 8.1 cm.

The average distance in L.E. = 8.4 cm.

III.—MYOPIA: 4 INDIVIDUALS, 8 EYES.

(1) R.E., M.=8 D. 10.3 cm. Longest distance=R.E. 10.3.

L.E., M.=8 D. 6.5 cm. Longest distance=L.E. 13.5.

(2) R.E., M.=2 D. 8 cm. Shortest distance=R.E. 8.

L.E., M.=2 D. 8.2 cm. Shortest distance=L.E. 6.5.

(3) R.E., M.=8 D. 8 cm.

L.E., M.=7 D. 13.5 cm.

(4) R.E., M.=9 D. 8 cm.

L.E., M.=9 D. 8 cm.

The average distance in R.E.=8.5 cm.

The average distance in L.E.=9.03 cm.

Distance of the approximate center of the blind spot below the horizontal line:

In Hyperopia: R.E., average 10.6 mm.; longest 25 mm., shortest 2 mm., and 2 coincident. L.E., average 7.3 mm.; longest 14 mm.; shortest 3 mm., and 2 coincident.

In Myopia: R.E., average 9.07 mm.; longest 19 mm.; shortest 5 mm., and 1 coincident. L.E., average 9.03 mm.; longest 17 mm.; shortest 11 mm., and 2 coincident.

In Emmetropia: R.E., average 10.3 mm.; longest 20 mm.; shortest 6 mm., and 1 coincident. L.E., average 9.8 mm.; longest 22 mm.; shortest 2 mm., and 1 coincident.

Emmetropia: R.E., long diameter, average 30.9 mm.; longest 42 mm.; shortest 19 mm. L.E., long diameter, average 31.4 mm.; longest 52 mm.; shortest 17 mm.

Hyperopia: R.E., long diameter, average 35 mm.; longest 50 mm.; shortest 14 mm. L.E., long diameter, average 33.6 mm.; longest 65 mm.; shortest 15 mm.

Myopia: R.E., long diameter, average 40 mm.; longest

50 mm.; shortest 30 mm. L.E., long diameter, average 36 mm.; longest 45 mm.; shortest 25 mm.

Emmetropia: R.E., transverse diameter, average 26.8 mm.; longest 37 mm.; shortest 16 mm. L.E., transverse diameter, average 26.4 mm.; longest 40 mm.; shortest 17 mm.

Hyperopia: R.E., transverse diameter, average 28 mm.; longest 40 mm.; shortest 15 mm. L.E., transverse diameter, average 26.9 mm.; longest 37 mm.; shortest 15 mm.

Myopia: R.E., transverse diameter, average 35 mm.; longest 40 mm.; shortest 20 mm. L.E., transverse diameter, average 35.2 mm.; longest 45 mm.; shortest 30 mm.

The following statements are of interest:

1. In comparing the two eyes in emmetropia we find that the distance from the center of the blind spot to the fixation point was a trifle longer, on the average, in the right than in the left eye. This difference is insignificant and the two distances may be considered equal. A variation of more than 2 cm. was present between the longest and shortest distance among all the cases, while the longest distance and the shortest distance were nearly identical in the two eyes; that is, that both eyes presented similar variations and that it was not characteristic of either right or left eyes to show abnormally long or abnormally short distances. In hyperopia the average distance was 3 mm. longer in the left than in the right eye, while the longest and shortest distance was almost the same in each eye. In myopia the cases were so few that the averages may be misleading and a larger number of cases might show different results. The average distance in the left eye was more than 5 mm. greater than in the right eye, and the longest distance as well as the shortest were both found in left eyes. In comparing the distances in the three varieties of refraction we find that the greatest distance was found in myopia as well as the shortest distance. The average distance in emmetropia and hyperopia was almost identical, while in myopia it was fully 5 mm. greater.

2. The center of the blind spot was, with few exceptions, below a horizontal line running through the point of fixation. In hyperopia the distance averaged 10 mm. in the right, and 7 mm. in the left eye, while the greatest distance was 25 mm., and the shortest 2 mm. In myopia the distance averaged 9 mm., the longest 19 mm., and the shortest 5 mm. In emme-

tropia the average was 10 mm., the longest 22 mm., and the shortest 2 mm. These figures show that the center was equally distant from the horizontal line in emmetropia and hyperopia, and was 1 mm. less in myopia.

3. The shape of the blind spot in emmetropia was, with few exceptions, oval, with the long diameter in the vertical or near the vertical axis. The exceptions were six in number; in four the outlines were circular, and in two the long axis was horizontal. This would seem to prove that the optic disc is seldom circular, but in the majority of cases oval, with its long axis vertical, and in a small minority oval, with its long axis horizontal, and that the shape is independent of the refraction.

In emmetropia the long diameter of the blind spot averaged 31 mm., in hyperopia 34 mm., in myopia 38 mm. The longest was in hyperopia and measured 65 mm., the shortest was also in hyperopia and measured 15 mm. In emmetropia the transverse diameter averaged 26 mm., in hyperopia 27 mm., and in myopia 35 mm. The longest was in myopia, 45 mm., and the shortest in hyperopia, 15 mm. From these figures it will be seen that the size of the blind spot was decidedly greater in myopia than in other states of refraction. Very few pairs of eyes showed equal measurement in either the distance of the blind spot from the fixation point or in the position or size of the blind spot, and variations, as great as existed between eyes in different individuals, were found in the eyes of the same individual.

The ophthalmoscopic appearances were noted in all cases examined and only healthy eyes were chosen. Only an approximate estimate in the situation and size of the blind spot could be determined by the ophthalmoscope, except in cases of myopia; here, the size of the blind spot corresponded with the degree of choroidal and retinal changes surrounding the disc, hence with the size and shape of the staphyloma. The practical conclusion that I should deduce from this analysis is that the blind spot has a greater bearing in measurement of the field of vision than has been accorded to it, and might, in the absence of a knowledge of its size, be mistaken for a scotoma of disease. The discovery that a portion of the field measuring 5×4 cm. of irregular outline between the 10° - 20° mark in the perimeter and in cases including both is blind, might lead to confusing conclusions as to the real character of the field. Ex-

amination of the eye and shape of the blind spot in cases of optic neuritis, choked discs and glaucoma, would probably be useful in delineating the course of the disease and the value of therapeutics, its increase denoting advance, its decrease, retrogression, of the affection. By carrying on this investigation and including the various types of disease which possibly modify the relations of the blind spot with the field of vision, I hope to arrive at data of diagnostic and therapeutic value.

TRAUMATIC ENOPHTHALMUS.

BY S. C. AYRES, M.D., CINCINNATI, OHIO.

THE rarity of traumatic enophthalmus prompts me to report the following case:

J. E., 35 years of age, a mechanic, gave the following history: Ten months ago he received a severe incised wound in the supraorbital region and almost directly through the eyebrow. The wound was inflicted by a broom-handle which was thrown at him by a shopmate. It was followed by severe swelling of the lids and orbital tissue. For a while it was painful, but later on the inflammation subsided, and as it did so the eye settled deeper into the orbit.

When I first saw him, in August, his eye presented that peculiar appearance resembling an artificial eye. The globe was sunken so that the cornea was 3 mm. deeper than that of the fellow eye. The right palpebral fissure measured 6 mm. in width and the left one 11 mm.

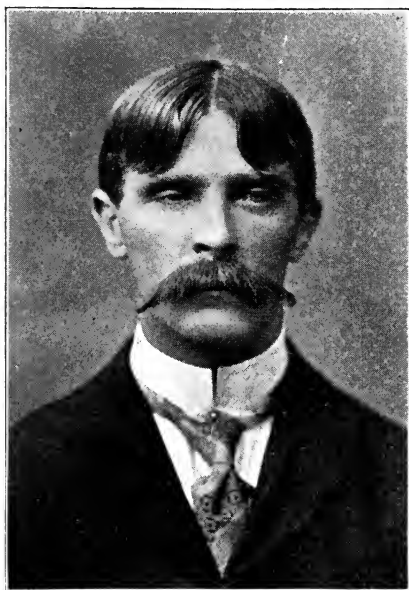
The motility of the eye was curiously involved. Motion inward was unimpaired, outward it was limited, downward it was abolished, and upward it was limited.

The globe was normal in size and tension. There was slight iridodialysis upward with partial rupture of the suspensory ligament and a resulting tremulous iris. The media were clear. The optic disc was pale. V.=¹⁵/_{cc}, not improved by glasses. There was no visible rupture of the choroid, nor detachment of the retina.

There was no evidence of any orbital fracture apparent by palpation. Patient stated that he bled from the nose after the injury. This might indicate a slight fracture of the orbital

walls or it might result from the blow, which came with great force.

In this case it would seem probable that the inflammation of the orbital tissue, which followed the injury, was responsible for the abnormal position of the eye. In contrast with this is the case reported by Dr. Schapringer in the *N.Y. Medicinische Wochenschrift*, June, 1890, and quoted by Noyes in the second edition of his book :



A girl, 7 years of age, was struck by her teacher and fell down striking her head on an iron grating. The cornea, it was estimated, had receded about 2 mm., but the functions and movements of the eye were unimproved. In three days the symptoms all disappeared. While these phenomena might be explained by the influence of the sympathetic, yet the case is not parallel with the majority of the cases reported where the trauma was associated with fracture or probable fracture of the orbital walls and where violent orbital inflammation ensued.

Dr. de Schweinitz, in Vol. VII. of the "Transactions of the American Ophthalmological Society," page 386, reports one case of enophthalmus where there was marked impairment of the motions of the ocular muscles on the injured side with dip-

lophia, and yet he thinks the phenomena best explained by a lesion of the sympathetic. He has collected, with his own, twenty-six cases in all.

In Langenbeck's case (a railroad accident) the eye was driven into the antrum of Highmore and finally fixed there.

In von Becker's (Helsingfors) case there was violent fracture of the lachrymal, ethmoid, and superior maxillary bones by the end of the cow's horn.

Gessner's three cases were all traumatic. He says: "The enophthalmos is produced by the mechanical falling back of the globe into the orbital cavity, the contents of which have been reduced by cicatricial contraction of the retrobulbar cellular tissue. An inflammatory participation of the ocular muscles is improbable on account of the absence of disturbances of motility." And yet, in two of his cases there was impairment of motility.

It would seem probable from a study of several of the reported cases, followed by inflammatory symptoms, that the impairment of motility was proportionate to the severity of the injury and the subsequent orbital inflammation. In my case, for instance, the motion of the inferior rectus was entirely and permanently abolished and that of the superior and external recti considerably impaired.

GLAUCOMA IN AN APHAKIAL EYE THREE YEARS AFTER EXTRACTION.*

BY S. D. RISLEY, M.D., PHILADELPHIA, PA.,

ATTENDING SURGEON WILLS EYE HOSPITAL—PROFESSOR DISEASES OF THE EYE IN
THE PHILADELPHIA POLYCLINIC AND COLLEGE FOR GRADUATES
IN MEDICINE, PHILADELPHIA, PA.

MRS. E., 77 years of age, consulted me in February, 1896, suffering from an over-ripe cataract in the right eye, and failing vision in the left, which proved to be due to incipient cataract. The lens was extracted without iridectomy from the right eye, the operation being perfectly smooth and recov-

*Read before the Ophthalmic Section of the College of Physicians of Philadelphia, October 17, 1899.

ery resulting without accident, leaving a central round pupil without demonstrable adhesions to the remaining capsule or in the region of the wound. On the twentieth day $V.=\frac{6}{IX}$.

Six months later she returned from her home in the interior with vision reduced to $\frac{6}{XL}$ by a dense opaque capsule. After a secondary operation, which resulted in a clear black pupil, vision rose to $\frac{6}{V}$, and remained at this, with perfectly satisfactory use of her eye until February, 1899, three years after the primary extraction, when she suffered a very severe attack of influenza, which permanently impaired her health, and was attended by a red and painful eye.

In March she began to have transient attacks of dim vision during which she was unable to read. They were unattended by pain and were often but momentary in duration, but at other times would last an hour or more.

These attacks of impaired vision became more frequent and severe until, on the 23rd of April, they culminated in a typical onset of subacute inflammatory glaucoma, with pain, and seriously impaired vision.

She then came to Philadelphia, and after a long journey by rail was so nearly blind from contraction of the field of vision, that she had to be led to a chair in the consulting room. Central vision was $\frac{1}{V}$ with difficulty, $T+2$; the cornea was steamy, there was some tenderness to palpation and a moderate degree of ciliary injection. She had suffered from pain in the ball and a severe hemicrania for three days. The pupil was round, central, and 3 mm., in diameter, but was firmly adherent to the dense gray capsule by an apparently annular synechia. The lower part of the anterior chamber was of normal depth but the upper and inner two-fifths of the iris were bulging forward, quite blocking the spaces of Fontana in that portion of the angle.

Iridectomy was advised and she was admitted to a private room in the Polyclinic Hospital, placed on salicylate of soda, internally, with eserine and gentle massage locally. In twenty-four hours the symptoms had so rapidly and completely subsided that iridectomy was deferred.

In a few days the iris bombée had disappeared, $T=n$, there was no pain or injection, and vision had risen to $\frac{6}{XII}$, while the field was approximately normal. She was then discharged from the hospital but kept under observation. The eye remained

healthy, with the single exception of a momentary attack of dim vision in June, until the latter part of August, when she suffered a complete recurrence of all the symptoms, subjective and objective.

She was again admitted to the hospital and an iridectomy upward performed on September 9th. The recovery was without reaction.

On September 29th, T= ∞ , vision was once more $\frac{6}{IX}$, the field was again nearly restored, and the eye comfortable. The ophthalmoscope now revealed a shallow glaucomatous cup, which was not present after the attack in April.

It is obvious that this case belongs in the category of secondary glaucoma. The recurring attacks of dim vision were doubtless precipitated by the gluing of the iris to the tough capsule which retracted after the capsulotomy into an unusually dense ring.

A NEW STATIONARY OPHTHALMOSCOPE WITHOUT REFLEXES.

BY WALTER THORNER, M.D.

TRANSLATED BY CARL BARCK, M.D., ST. LOUIS, MO.

Introductory Remarks by the Translator.

THE most interesting new instrument by far, in fact the only one of value exhibited at the last International Congress at Utrecht, was Thorner's Stationary Ophthalmoscope. A practical demonstration of its use was given each morning at the New Eye Clinic, which was highly appreciated by everyone present. Whilst surpassing any other ophthalmoscope in the combination of a large field of view with brightness of illumination, the most important feature is the elimination of all the reflexes; consequently it is especially the examination of the macula lutea region which will be facilitated by the new instrument, and it is to be hoped that it will shed new light on many of the still obscure macular affections. I must confess that never before have I seen the macula lutea region of the adult with such beautiful clearness.

The time was naturally too limited, each awaiting his turn, to admit of any more exhaustive examination, but was sufficient to justify the statement that the instrument fulfills perfectly all the inventor claims for it.

The optical considerations which led the inventor to the construction of his ophthalmoscope seemed to me of sufficient interest to the profession to translate the entire article which appeared in the *Zeitschrift f. Psychologie und Physiologie der Sinnes-Organen*, Vol. XX.

Since the invention of the ophthalmoscope by Hermann von Helmholtz, in 1851, numerous modifications have been proposed. Of all the different methods of examination, however, only two have proven to be of practical value:

1. The examination with a perforated plane or concave mirror, either unaided by optical adjuncts, or aided only by correcting glasses for the different states of refraction, adjusted behind the mirror.

2. The examination with a perforated concave mirror, aided by a convex lens of 5 to 10 cm. focal distance, which forms an inverted image of the fundus oculi.

The proposed changes concern first the mirror. Apart from the reflecting glass-plate, used by Helmholtz himself, there have been suggested plane, concave and convex mirrors of all possible diameters and radii of curvature, with apertures of different position and size, and prisms of total reflection with plane or curved surfaces. The second variety of adopted changes applies to the optical adjuncts, and it was again Helmholtz who first endeavored to examine the fundus through two convex lenses arranged according to the principles of the telescope. He emphasizes theoretically the analogy with other optical instruments, and the easy adjustment for different states of refraction by changing the distance of the lenses from each other. As a disadvantage, he mentions the necessity of centering them, the difficulty of the proper accommodation of the observed eye, and, finally, that he could not get a distinct picture on account of the short focus of the lenses, necessary to the magnification of the field of view. According to the same principle numerous apparatuses have been constructed afterwards, but they have never equalled the other two methods of examination in practical value.

There are principally two reasons for this: If the lenses are placed between the mirror and the eye of the patient, the reflexes in the lenses and the enlarged corneal reflex are disturbing to such a degree, that an examination becomes next to impossible. If, on the other hand, the lenses are set behind the mirror, the corneal reflex is still very annoying. Furthermore, the aperture in the mirror forms a diaphragm, in consequence of which there is no perceptible advantage in regard to the field.

Lately¹ I have constructed an ophthalmoscope which gives a field of view of 37° in the magnitude of the upright image, and which is totally free from annoying reflexes.

Before explaining its construction I shall enumerate the general laws which led me to the calculation of this ophthalmoscope, in a synopsis which seems to me most comprehensive and best adapted for use. I shall not enter into the proof of the formulæ, as they are resultant from well-known laws, which are contained partly in "Helmholtz's Text-Book of Physiological Optics."

THE REFLEXES.

There is one main cause why the principles for the construction of other optical instruments could not be applied to the ophthalmoscope. The light, of necessity returning from the observed eye to the observer in the same path which it took from the source of light, is partially reflected at its entrance into every new medium, and in such a manner that these reflected rays are mingled with those coming from the fundus. This is least noticeable if only a small portion of the fundus is under observation; it becomes more annoying the larger the area to be illuminated; in an extensive field the entire picture is covered by a haze.

Up to date, only one device has been frequently used to dispose of the reflexes. The eye is surrounded with a closely-fitting box filled with a physiological salt solution, which is closed in front with a plane glass-plate. Because the salt solution has about the same index of refraction as the human cornea, the incident rays of light are not reflected at the cor-

¹Preliminary communication in the *Deutsche Medicinal-Zeitung*, No. 98, December 8, 1898.

nea. I have made no experiments with this method because it appeared to me *a priori* too cumbersome for practical use.

A second possibility to dispose of the reflexes is given in the use of polarized light, which had already been tried by Helmholtz during the construction of his first ophthalmoscope, in order to weaken somewhat the reflexes. If the light reflected from the retina possesses qualities differing from those of the light reflected from the cornea, both kinds of light might be made to pass through an apparatus which would neutralize the rays reflected by the cornea but allow those reflected by the retina to pass. One's first thought might be that the light reflected by the cornea is already linear-polarized; but this is the case only for a given angle of reflection. If the corneal reflex produced by illumination with a circular luminous area is viewed through a Nicol's prism, only portions of it become totally extinguished—namely, those which are reflected just in the angle of polarization for the cornea. In general, the reflex is only more or less diminished in intensity. In order to obliterate it entirely, it is necessary to illuminate the eye by linear-polarized light. This will be reflected from the cornea as linear-polarized, but from the fundus as depolarized light. If then, the totality of the rays is viewed through a Nicol's prism, whose plane of polarization forms an angle of 90° with the plane of the incident light, the corneal reflex becomes extinguished, whilst the depolarized light coming from the fundus becomes again linear-polarized and, therefore, reaches the eye of the observer. In the same manner as the corneal reflex disappears by this arrangement, the reflexes of one or more interposed lenses disappear likewise.

I have made numerous experiments applying this principle, the results of which I will now mention. At first, I used Helmholtz's arrangement, namely, a glass-plate, serving simultaneously as polarizer and illuminating mirror, the perpendicular of which formed an angle of 55° with the axis of observation and with the direction of the incident light. If a number of such glass-plates are placed, one behind the other, the same scheme can also be used as analyser, because only such light is transmitted whose plane of polarization forms an angle of 90° with the plane of the light reflected from the glass-plates. But by this method the reflex is far from becoming entirely obliterated. Furthermore, there is only a given

angle of reflexion, at which the reflected light is really linear-polarized. For the illumination of a larger area, however, the rays of light necessarily reach the eye in different directions, and, therefore, the angle of many of the reflected rays differs considerably from the angle of polarization.

The aim is attained much better if Nicol's prisms, whose planes of polarization form a right angle with each other, are used as polarizers as well as analyzers. With this arrangement the principle of the ophthalmoscope may be combined in many various ways. The simplest, theoretically, seems to be the use of only one Nicol's prism, the path of the extraordinary ray serving for observation, whilst the ordinary ray is not absorbed, as usual, at the wall, but passes through and reaches the source of light. I have accomplished this by cementing one side of a right-angled prism, whose other side was silvered, to the polished wall of the Nicol.

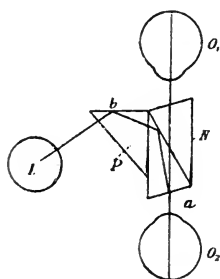


FIG. 1.

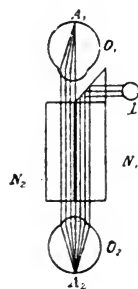


FIG. 2.

In figure 1, O_1 represents the eye of the observer, O_2 the eye observed. From the source L , the light reaches the hypotenuse of the right-angled prism P about vertically, is reflected from the silvered side b , and enters through the other side, the Nicol N . There it is totally reflected at the plane of bisection, reaches the point a , and makes its exit through the anterior surface toward the eye, O_2 . Of the rays of light returning from O_2 , those belonging to the corneal reflex, being in the same plane with the incident rays, return to the source of light, whilst the depolarized rays, coming from the fundus, reach partially, by way of the extraordinary rays, the eye O_1 . In this scheme, however, the diffuse reflexes which are formed within the Nicol, are of great disadvantage, so that the picture of the fundus is considerably blurred.

This may be avoided if, instead of one, two Nicols are used, which are fastened closely to each other in such a manner that their planes of polarization are at right angles. Whilst the light enters the one by reflection from the hypotenuse of a right-angled prism, the other serves for observations. This arrangement produces a fairly good image without reflexes, but the field of view is small on account of the tubular form of the Nicols, because a given point of the fundus can be seen only, if rays emitted from it traverse both Nicols, to the light as well as to the observer.

In figure 2, O_2 represents again the observed eye, O_1 the eye of the observer. From the point A_2 of the fundus of O_2 one half of the rays passes through the Nicol N_1 to the source of light, a small lamp L , and *vice versa*, the other half passes through the Nicol N_2 to the eye O_1 producing an image of A_2 at A_1 .

Based upon the principle of polarization, I have found the following arrangement to be the most practical:

Between the eye O_1 (observer) (Fig. 3) and O_2 there is a plane mirror S , inclined at an angle of 45° . The coating of this is broken, lattice-like, the strips being 1 mm. wide, and a like distance apart from each other. The convex lenses, 1, 2, 3, are all of the same focal distance and are arranged in such a manner that the pupils of O_1 and O_2 and the flame L are simultaneously pictured upon the mirror S . As the Nicol N_1 is placed closely in front of the pupil of O_1 , and N_2 closely in front of the flame L , neither the Nicols nor the pupils of the eyes act as diaphragms.

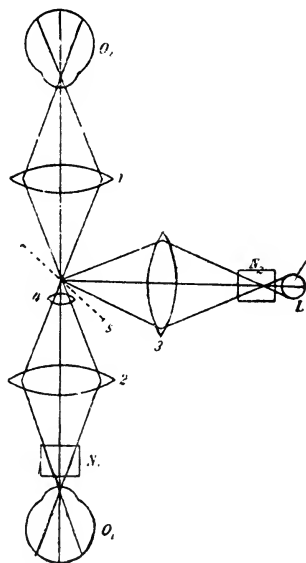


FIG. 3.

In order to get a distinct picture of the fundus, it is necessary to place the convex lens 4 behind the mirror. The lines in the drawing represent the rays which limit the field of view. The image of the flame L formed by lens 3 in the plane of the mirror is re-formed by the lens 1 in the pupillary area of O_2 .

and, consequently, a large area of the fundus is illuminated. The plane of oscillation of the rays polarized by Nicol N_1 is at right angles to the plane of light passing N_2 . Although the linear-polarized light becomes elliptically polarized through the reflection from the mirror, the difference is such a trivial one in the given position of the mirror that the reflexes disappear entirely.

By this arrangement it is therefore most clearly demonstrated that with the aid of polarization of the light, it is really possible to dispose of the reflexes from the cornea as well as from the interposed lenses. In spite of this, I have abandoned the use of polarization, because the Nicol's prisms diminish considerably the already weak light reflected from the fundus, and because the same end, elimination of the reflexes, can be accomplished in a much more simple manner.

Suppose a dividing plane be drawn in such a manner that it reaches the center of the cornea of the observed eye, and suppose that light is thrown through one half of the pupil whilst the other half serves for observation, it is apparent that there can be no reflexes. Up to the cornea the system of illumination and the system of observation are entirely separate, thence the pencils which pass each half of the pupil mingle until they become united upon the fundus. But such a separation of the systems of illumination and observation is practically impossible, because a real partition dare not touch the cornea.

If it does not reach the cornea, if a space of a few millimeters only is left, so many pencils are reflected from the system of illumination to the system of observation that no observation is possible. This missing portion, however, of the real partition can be substituted optically by the image of such.

First, suppose, for simplicity's sake, that the eye O_2 (Fig. 4) is illuminated by a reflecting glass plate $g g$. In order to illuminate the largest possible area of the fundus, let an image of the flame L situated at double the focal distance from a convex lens A , of large aperture, be produced within the pupil of O_2 . Consequently this image is of the same size as L itself. The fundus is observed in the inverted image by means of a lens B of 25 cm. focal length, placed in the center between the observer O_1 and the observed O_2 , and at a distance of 50

cm. from each. An image of the fundus is then formed between B and O_1 at a convenient accommodative distance. Now let one-half of L be covered by a diaphragm $s s$. Then an image of $s s$ will be formed within the half-pupil O_2 , $b c$, that is, this half becomes darkened, whilst the other half, $a b$ remains illuminated. In the fundus, however, of the eye O_2 the same area as before remains illuminated, but with half the intensity. The non-illuminated half of the pupil $b c$ is pictured within the half-pupil of O_1 $e f$, whilst the illuminated half is pictured within $d e$. All rays, therefore, which are reflected from the illuminated portion of the cornea of O_2 possess the same qualities as if $a b$ itself were luminous, and the pencil is propagated to $e d$, whilst no ray of this reflex can fall upon the area $e f$.

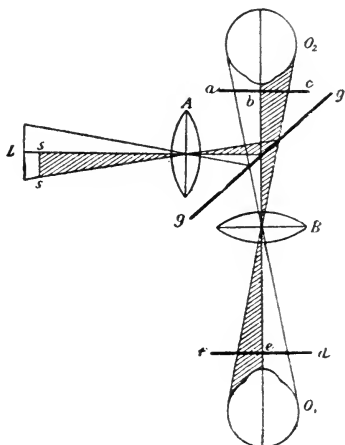


FIG. 4.

If now there is another diaphragm placed before $d e$, the corneal reflex is entirely obliterated, and only light reflected from the fundus enters the eye of the observer O_1 . The size of the visible area is not diminished by this diaphragm, but the intensity of the illumination is reduced to one half.

In the figure the hatched portion represents the pencil, which is composed exclusively of rays coming from the fundus of O_2 , whilst in the unhatched portion, the rays coming from the fundus are mingled with those reflected from the cornea. For practical reasons it is not advisable to use a glass-plate for reflection; first, because it reflects only a small portion of the incident light, thereby necessitating a very strong flame; second, because if brightly illuminated, it diffuses the light in all directions, which interferes with the clearness of the image. It is, therefore, better to replace it by a totally reflecting prism, which, being non-transparent, must cover only one half of the pupil of O_2 .

FIELD OF VIEW AND MAGNIFICATION.

Having accomplished the elimination of the reflexes by this method, let us consider the conditions under which the largest possible field of view can be seen most highly magnified and illuminated. To simplify matters, we suppose that the eyes of the observer and the observed are emmetropic. I will, furthermore, not take into consideration the loss of light through reflection and absorption by the different lenses, as it is of slight importance and would only complicate the subject.

If, to begin with, we assume the fundus to be self-luminous, a divergent pencil of rays is emitted from every point of it, the basis of which is given by the pupillary edge of the iris. By refraction at the different refracting surfaces this divergent pencil is changed into a pencil of parallel rays, so that the point from which it emanates lies apparently at an infinite distance.

In order to conceive the laws governing the enlargement and the field of view, the following apparatus may be imagined: In a darkened window there is a circular opening of about 8 mm. diameter—the size of the dilated pupil. Then the pencils of rays, coming from visible objects, such as houses outside, form similar pencils like those coming from the fundus after they have left the eye. In reality the pencils are divergent, but at so minute an angle that in this illustration we may consider them as parallel. Consequently, the path of the rays between the observer and the window corresponds to that between the observer and the iris of the observed eye, whilst, on the outer side of the window, this is not the case. If now, in this example, the street is viewed unaided by lenses corresponding to the examination in the upright image, a distinct image is seen when the eye of the observer is accommodated for an infinite distance. This image is neither magnified nor diminished. We will term its size the “natural angular magnitude.” To this natural angular magnitude corresponds the magnification of the upright image, which we might term likewise the “natural angular magnitude of the fundus.” For the time being it is unnecessary to determine the ratio of magnification of this upright image to the actual size of the fundus seen after removal of the anterior half of the globe.

The extent of the visible area depends upon the distance

of the observer from the aperture in the window. The shorter the distance the larger the area, and if the observer could approach so closely that his iris would coincide with the aperture, the field would be unlimited. If the pupil of the observer and the aperture in the window are centered, the middle of the field of view appears most brilliant, the brightness decreasing toward the periphery. The size of the field can be expressed in a very simple formula if we consider it only up to those points, the brightness of which is one half of the brightness at the center. Peripherally to these points the brightness of the field decreases so rapidly that we can neglect this most extreme portion.

On close approach of the observer the principal rays emanating from these points strike the edge of the aperture in the window. In consequence the tangent of half of the visual angle is equal to the radius of the aperture divided by the distance of the anterior nodal point of the observing eye from it. For the latter we can substitute, without any considerable error, the distance of the plane of the iris from the aperture. Instead of expressing the field of view by an angle, it is more practical to express it by a fraction, whose numerator is the diameter of the aperture and whose denominator is the distance between it and the iris of the observer, that is, the double tangent of half of the visual angle. As it is impossible, in the usual examination with the upright image, to approach the human eye closer than 5 cm. on account of the apparatus for illumination, the field of view can never be larger than $\frac{8}{50} =$ about $\frac{1}{6}$, or, expressed by the angle, 9° . This field, however, can not be seen in its entirety, because only a portion of it is illuminated at a time, but by revolving the mirror the single points may be illuminated one after the other.

The conditions are different if an optical system is interposed between the aperture in the window and the eye. Let us consider first the use of a single convex lens. In order that the aperture in the window does not act as a diaphragm, an image of it must be formed upon the plane of the iris of the observer. The field of view is then limited by the rim of the lens and its extent is expressed by the formula:

$$\frac{\text{Diameter of convex lens.}}{\text{Distance of lens from iris.}}$$

The ratio of the angular magnification to the natural angular

magnitude is then equal to the diameter of the aperture divided by the diameter of the image formed by the lens within the pupil of the observer. Consequently objects on the street appear in natural size if the image of the aperture produced by the lens upon the iris-plane is just as large as the aperture itself. They are apparently diminished in size when the image is larger, and magnified when the image is smaller than the aperture. The eye must be held at such a distance from the convex lens that the picture of the street, which is formed at the focus of the lens, can be seen distinctly. The accommodation required does not materially alter the size of the image upon the retina of the observer but it produces the sensation of an apparent diminution.

Let us now apply these considerations to the observation in the inverted image. The convex lens commonly used for this purpose has a diameter of 30 mm. and a focal distance of 75 mm. In order to see distinctly the usual distance of the eye from the aerial image is about 225 mm., therefore from the lens itself 300 mm. = 4 f. (focal distance). The iris of the observer is then pictured by the lens at a distance of $\frac{1}{3}$ f. = 100 mm., and consequently reduced linearly to $\frac{1}{3}$. The iris of the observed must occupy this position in order not to act as a diaphragm. Consequently the image possesses $\frac{1}{3}$ of the natural angular magnitude or $\frac{1}{3}$ the size of the upright image. The field of view is $\frac{30}{300} = \frac{1}{10}$, and in angles 6° . But as in this field all parts appear only $\frac{1}{3}$ as large as in the upright image, it actually corresponds to an area of $\frac{3}{10}$ of the fundus.

If it is now desired to attain the magnification of the upright image and at the same time a larger field of view than $\frac{1}{6}$, this can be accomplished only by the interposition of an optical system which pictures the pupil of the observed in its natural size within the pupil of the observer. If *one* convex lens is used for this purpose, it must be placed midway between the two pupils, distant 2 f. from each; and its focal distance must be such that the aerial image is distinctly visible without strained accommodation, else an additional convex lens directly in front of the eye must be added. The largest lens which can possibly be used in this arrangement has a diameter of $\frac{1}{2}$ f. In this instance the field of view is:

$$\frac{\text{Diameter of lens}}{\text{Distance of lens from the eye}} = \frac{75}{2} : 150 = \frac{1}{4}.$$

Consequently a slight advantage is gained in comparison to the observation without a lens. A decided enlargement of the field of view can be obtained by the use of *two* convex lenses of equal focal distance. They are arranged in such a manner that the pupil of the observed lies in the anterior focus of the one, the pupil of the observer in the posterior focus of the other, and their distance from each other is $2 f$, thus forming a telescopic system.

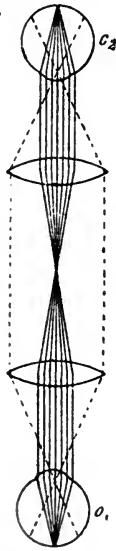


FIG. 5.

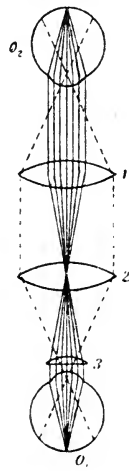


FIG. 6.

In Fig. 5 the dotted lines represent those principal rays which form the limits of the field. The unbroken lines represent the path of the pencil emitted from one point of the fundus. It is apparent that the field is limited only by the rim of the lenses and that the principal rays between the two lenses run parallel. In consequence a change of the relative distance of the two lenses has no influence upon the size of the field of view and the angular magnification, provided that the distance of the pupil of each eye from its respective lens remains the same; it is only the position of the image which is changed thereby. The field of view then becomes equal in size to the diameter of the convex lenses. If both eyes are emmetropic and the accommodation is relaxed, the observer sees a distinct image if the distance between the two lenses equals $2 f$. But

this scheme possesses the disadvantage that the picture is very chromatic and that its periphery is not sharply defined, because the plane of the image is too much curved. These drawbacks can be eliminated if the convex lenses are brought nearer to each other, so that their relative distance becomes equal to 1 f., the distance of each eye from its respective lens remaining unaltered. The image is then formed at the place of the lens 2 (Fig. 6) next to the observer, and in order to see distinctly the observer must use a third convex lens (3) of the same focal distance which is placed closely before his eye. This management renders the image nearly achromatic and equally distinct in its entire area. A slight curvature of the image towards the observer remains, but this is advantageous for our purpose, as the retina of the observed eye is considerably curved in the opposite direction and these two curvatures compensate each other.

If anomalies of refraction are present their correction can be accomplished easily by changing the distance between the lenses 1 and 2 within certain limits; for the highest degree of hyperopia and myopia the lens 3 is replaced by a relatively stronger or weaker one.

The diameter of the lenses 1 and 2 can be increased to $\frac{2}{3}$ f. without obscuring the image. The field is consequently also $\frac{2}{3}$ or $= 37^\circ$. In addition to the three-fold linear enlargement it is also five times as large in superficies as the field of the inverted image with the usual three-inch lens which embraces only $\frac{3}{10}$ of the fundus. It can be proved by calculation that this system of lenses *in toto* is movable between the two eyes in the direction of the axis without changing the magnification or field of view, provided that the distance between the two pupils $= 3$ f., and the relative distance between the three lenses remains constant; only the diameter of lens 3 is to be increased if the lens is removed from the eye. The system can therefore be placed in any position within certain limits. If we compare it to an astronomical telescope the convex lens 1 corresponds to the objective, lens 2 to the collective lens, and lens 3 to the ocular. It differs from the telescope in so far that the objective and the collective lens possess very large diameters and that the image of the objects is not magnified but seen in natural angular magnitude.

As a matter of course the field can only be seen in its en-

tirety if illuminated in its entire area. It is, therefore, necessary to use for illumination a system similar to that for observation, and the above outlined principle of the diaphragm, which produces an image without reflexes, can be easily combined with such a system.

THE BRIGHTNESS OF THE OPHTHALMOSCOPIC PICTURE.

The next question to be investigated has reference to the brightness of the ophthalmoscopic picture. This can be calculated from the following laws:

1. A given point of the observed fundus can be seen by the observer under the condition only that a portion of the rays, emitted by it, reach the source of light and another portion the pupil of the observer.
2. A given point of the observed fundus is illuminated maximally, if all the rays which it would emit, if self-luminous, reach the flame. The degree of illumination is then in proportion to the size of the pupil.
3. The observed fundus is seen illuminated maximally by the observer, if all the rays which a point of the fundus of the observer would emit, if self-luminous, reach the pupil of the observed. The brightness is then proportionate to the size of the pupil of the observer.

The third proposition is resultant from the second, if the flame is replaced by the fundus of the observed, and the observed eye by the observer.

Let us take for example: From a given point of the fundus a pencil of rays emanates which leaves the eye as a parallel pencil. The diameter of this pencil is equal to the diameter of the pupil. If now there is anywhere in the path of this pencil an evenly-luminous flame of larger size than the pupil, all rays of this pencil meet a portion of the flame, and simultaneously rays emitted from these points of the flame reach the respective points of the fundus. As the pencil is of the same diameter throughout, the distance of the source of light is immaterial. At all times all the rays emanating from the given point of the fundus reach portions of the flame and therefore the illumination does not change with the distance as long as finite relations are under consideration. If a system of lenses is interposed between the eye and the flame, the rays emanating from one point form no longer a parallel pencil, but a cone,

whose diameter is a different one at each transverse section. If, now, the flame is placed in the path of such a cone, the given point will be illuminated as brightly as before, provided that the flame covers the entire face of the section. If the flame is situated near the apex of the cone, it can be very small; if at a section of a larger diameter, it must be correspondingly large.

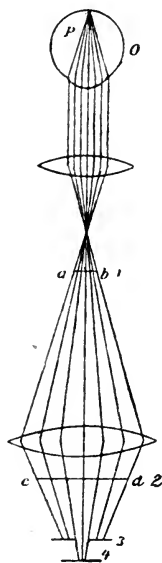


FIG. 7.

In Fig. 7, it is immaterial whether the flame is placed in the position 1 and has the size of $a b$, or in the position 2 with the size $c d$. But if a diaphragm is placed anywhere, for instance at 3, the flame occupying the position 4, the degree of illumination of the point p is only a part of the maximal one; their proportion is the same as that of the aperture in the diaphragm to the section of the pencil at 3. Let us apply this consideration to the ophthalmoscope: We will calculate only the degree of brightness for the points situated in the center of the field of view and assume a flame of nearly uniform intensity like a petroleum or gas flame.

In the examination with the upright image, the pencil of parallel rays coming from a point of the observed fundus is reflected by the common plane mirror to the source of light and its transverse section is not changed. Consequently all rays reach a portion of the flame and the point will be illuminated maximally. But the mirror itself acts as a diaphragm because the aperture does not reflect. Let the dilated pupil have a diameter of 8 mm. Then the maximal illumination can be expressed simply by the square contents of the pupil in sq. mm. It is then $= 4^2 \pi = 16 \pi$. If the aperture of the mirror has a diameter of 4 mm., one-fourth part of the pencil in the plane of the mirror is not reflected and the illumination is consequently three-fourths of the maximal $= 12 \pi$. All rays emanating from a point of the fundus of the observer reach the pupil of the observed, because this pencil has only a diameter of 4 mm., and the pupil of the observed one of 8 mm.; therefore the fundus is seen with maximal brightness. This brightness can also be expressed by the square contents of the aperture in the mirror;

it is $= 2^2 \pi = 4 \pi$. By multiplying this constant with the one found for the illumination, we get as total resultant for the brightness of the upright image $48 \pi^2$.

In considering the inverted image we will assume the same constants as above: Diameter of the dilated pupil : 8 mm., convex lens of 30 mm. diameter and 75 mm. focal distance, distance of pupil of the observed eye from lens : $\frac{4}{3}$ f., distance of lens from eye of observer : 4 f., diameter of aperture in mirror : 4 mm., focus of mirror : 150 mm. Then the pencil emanating from a given point at the fundus of the observed eye has a diameter of 8 mm. in the plane of the lens, and one of 24 mm. in the plane of the mirror. From this point to the flame the transverse section again decreases, so that all its rays reach portions of the flame. The diaphragm occupies in this instance only $\frac{1}{36}$ of the transverse section, the illumination is therefore $\frac{35}{36}$ of the maximal one, or $= \frac{35}{36} \times 16 \pi = 15.6 \pi$. The pencil of the rays coming from one point of the fundus of the observer has again a diameter of 4 mm., in the plane of the pupil of the observed $\frac{4}{3}$ mm. and consequently enters it entire. The fundus is therefore seen with the maximal brightness 4π . The product: $15.6 \pi \times 4 \pi = 62.4 \pi^2$ expresses the brightness of the inverted image, which is considerably greater than the brightness of the upright image.

[TO BE CONCLUDED].

BETA-EUCAIN AS AN ANÆSTHETIC.—In a paper on Beta-Eucain as an anæsthetic in eye, nose and throat work, published in the *Medical News*, Dr. W. H. Poole reaches the following conclusions:

1. Beta-Eucain is decidedly less toxic than cocain, therefore superior to it.
2. Its aqueous solutions keep well and can be sterilized by boiling without destroying the activity of the drug.
3. It produces anæsthesia equally as well and sometimes better than cocain.
4. It is superior to cocain in that it does not cause heart depression or other unpleasant effects.
5. It does not cause mydriasis or disturbances of accommodation, which is an advantage in some cases.
6. It is less dangerous to the cornea than cocain, inasmuch as it does not cause desquamation of the superficial epithelium.

MEDICAL SOCIETIES.

A DISCUSSION ON THE PATHOLOGICAL SIGNIFICANCE OF SYMPATHETIC IRRITATION, AND ITS CONNECTION, IF ANY, WITH SYMPATHETIC OPHTHALMITIS.

HELD IN THE SECTION OF OPHTHALMOLOGY OF THE BRITISH MEDICAL ASSOCIATION AT ITS SIXTY-SEVENTH ANNUAL MEETING.

[CONCLUDED FROM PAGE 319, OCTOBER NUMBER.]

II.—PROFESSOR LANDOLT,
Paris.

PROFESSOR LANDOLT quite agreed with Mr. Cross' conclusions. A lost eye which might become a danger to the fellow eye should be removed. If he had made this statement some twenty or thirty years ago it would have seemed superfluous, since everybody would have agreed with this principle. But since then many proposals had been made to save the healthy eye without enucleation of the damaged eye, such as resection of the optic nerve, of the ciliary nerves, subconjunctival injections of antiseptics, etc. He had never followed any of these procedures, but a short time ago he had the opportunity of seeing a case in which, after the penetration of one eye by a foreign body, notwithstanding subconjunctival injections of sublimate, both eyes followed the ordinary course—that is to say, the first became very severely inflamed, and gradually shrank, whilst the other non-wounded eye manifested the symptoms of sympathetic ophthalmitis in a pronounced degree. The removal of the shrinking eye, in which a foreign body was subsequently found, stopped the further development of the sympathetic ophthalmia in the other.

III.—MALCOLM M. MCHARDY, F.R.C.S.Edin.,

Professor of Ophthalmology, King's College, London.

MR. MCHARDY said: It is satisfactory to recognize that this company of highly experienced ophthalmic surgeons, sitting under our distinguished President, who has such unsurpassed, if not indeed unparalleled, experience in cases of eye injury, are agreed on one point—namely, as to the direct duty of recommending and urging the prompt removal of an eye blinded by injury. They say the rule is for doctors to differ; maybe oculists do so also; but whether that be the rule or no, it is proved by the exception that we are not differing, but agree as to the treatment for a pathological chain of events, which we recognize we have not yet satisfactorily disentangled. Our opinion and advice may, it seems, be briefly and comprehensively summed up in the speech I have to repeat only too often, but happily seldom or never without carrying the desired conviction to the patient: "My friend, you know that no tenant is better than a bad tenant; I know that your injured eye is the worst tenant you could have. It was an eye while it could see; now it can not, and will not again see; it may at any moment cause the gravest danger to the sight of your only remaining organ of sight. It is good business to cut a first loss at once; part with that injured bad tenant, and have peace of mind as to the security of your only seeing eye." This reminds me of the excellent counsel of that Nestor of English ophthalmologists, our revered Sir William Bowman. He said, "In such cases as those in which you are bound to recommend enucleation of the injured eye for the insurance of the fellow, you should urge the enucleation, but you should be careful never to proclaim it as necessary to the salvation of the sight of the fellow eye. The period which may elapse between injury of the exciting eye and inflammation of the sympathizing eye is so variable, even from three weeks to forty years, and if the precaution named be omitted, each year of such postponement tends to damage the patient's estimate of the oculist." I have never eviscerated; and I gather that none of us here, with our special experience, would in our own person allow delay, or any substitute for enucleation, to postpone our certain relief, by enucleation of the injured eye, from our well-grounded nightmare, that, at a future date, sympathetic ophthalmia might overtake our working eye.

IV.—HENRY CALEY, F.R.C.S.,

Deputy Surgeon-General, I.M.S. (Retired).

SURGEON-GENERAL CALEY said a case of sympathetic irritation, the symptoms progressing to sympathetic inflammation in one eye, came under his notice in the person of a member of the Public Works Service in India, who seventeen years previously had been shot in the other eye. It was not known whether the shot was lodged in the globe. The injury was followed by inflammation and gradual loss of sight, only bare perception remaining. After this interval of seventeen years the injured eye became sensitive and slightly inflamed. This was soon followed by sympathetic irritation, with symptoms of pain, tenderness, and congestion in the good eye. He removed the injured eye and found a shot lodged in it. The irritation of the sound eye quickly subsided and did not return, and good sight remained. This attack must, he thought, have been due to some neurotic influence, and not due to direct microbic or other inflammation spreading from the injured eye.

V.—C. DEVEREUX MARSHALL, F.R.C.S.,

Curator and Librarian, Royal London Ophthalmic Hospital, Moorfields.

MR. MARSHALL said: I am sorry not to have been able to bring forward as much evidence on this subject as I should have wished, but I found it impossible owing to want of time. With regard to the two theories which are held, I have always seen great difficulty in accepting that of Deutschmann. If sympathetic ophthalmitis were the result of micro-organisms traveling around to the healthy eye from the injured by way of the optic nerves, we should certainly expect to find the disease most marked in those cases where the eye was most surrounded with organisms such as in cases of panophthalmitis and gonorrhæal ophthalmitis. As a matter of fact, it is just these cases which do not produce the disease, but the comparatively quiet cases in which there is an injury to the iris or ciliary region. Again, some of Deutschmann's animals did certainly show signs of disease in the other eye after the injection of organisms into the optic nerve sheaths, but only if they escaped the danger of general infection or of meningitis, of which many died. No one ever heard of a patient having an eye likely to produce sympathetic disease suffering in this

way. Again, it is a cyclitis rather than an optic neuritis which we look for. Organisms are said to have been found in the optic nerve and in the ciliary body of the sympathizing eye, but the evidence of this requires confirmation before it can be thoroughly accepted. I am much interested in Mr. Cross' suggestion that a combination of the two theories may explain some facts which neither alone are capable of doing.

VI.—PROFESSOR G. E. DE SCHWEINITZ, M.D.,
Philadelphia.

PROFESSOR DE SCHWEINITZ said that he agreed with the views expressed by Mr. Cross and Dr. Landolt as to the treatment of an eye liable to excite ophthalmitis. He maintained that although there might be cases in which it was impossible sharply to differentiate between sympathetic ophthalmitis and sympathetic irritation, these two affections should be regarded as separate diseases, each with its own pathology. He concluded with a plea for a more thorough examination of patients with sympathetic ophthalmitis, an examination of the blood for leucocytosis, of the range of temperature, etc., and suggested that such examinations might afford materials for differential diagnosis.

VII.—R. A. REEVE, M.D.,

Professor of Ophthalmology and Otology, University of Toronto.

DR. REEVE said: In a case of sympathetic irritation in which distinct photophobia had been present for fifteen years, necessitating the wearing of smoked lenses, and in which the lost eye was much congested and very irritable, the cataractous lens spontaneously dislocated, and recurrent hæmophthalmos occurred. Mules' evisceration was followed in a few weeks' time by complete disappearance of the photophobia. In the only two cases of sympathetic ophthalmitis (iritis) under my care which have recovered, enucleation was done. This is to me a significant fact. In the first instance, fully twenty-five years ago, the inflammation of the second eye did not appear until several weeks after enucleation. Atropine and local depletion, with the internal exhibition of mercury, were pushed and full recovery ensued. In the second case the patient was suffering from the abuse of alcohol, and the sympathetic inflam-

mation was fully set up in three weeks after injury to the exciter. Prompt enucleation in conjunction with atropine, mercury, etc., resulted in full recovery.

VIII.—ADOLPH BRONNER, M.D.,

Surgeon, Bradford Eye and Ear Hospital.

DR. BRONNER had seen and reported on a case of sympathetic ophthalmia in which there was no external wound of the injured eye. The patient, a woman, received a blow from the fist on the eye. There was discoloration of the lens, hæmorrhage into the vitreous, but no external wound, as proved by microscopical examination. In three weeks sympathetic ophthalmia of the second eye set in. The chief symptoms were keratitis punctata and papillitis. The injured eye was enucleated, and the vision of the sympathizing eye improved up to ⁶/_{XVIII.}

IX.—JOHN HERN, M.D.,

Ophthalmic Surgeon, and Surgeon, Darlington Hospital.

DR. HERN said: There can, I think, be no doubt that we have, as Mr. Cross says, two conditions—one a reflex neurosis, the other some condition of inflammation (microbic or otherwise) traveling back, and invading by continuity the good eye. I have seen two interesting cases bearing on this question of reflex neurosis. Both were men, both otherwise healthy, and both had a shrunken stump. In the first case I could produce an attack of sympathetic irritation by placing a glass eye on the stump. I removed the stump, and the eye is now worn with comfort and without any irritation. In the second case every now and then attacks of inflammation occurred in the good eye, which did not go on to injury of the sight or to the destructive cyclitis usually experienced, but the interesting point is that symptoms of cerebral and general nervous irritation were constant, so much so that his wife refused to live with him. The stump was removed, the remaining eye has never since been inflamed, and the general and cerebral irritation has entirely disappeared now for at least three years.

REPLY.

MR. RICHARDSON CROSS, in thanking the foreign visitors and members for their valuable experiences, expressed his sat-

isfaction that the general opinion had been strongly expressed against the retention of dangerous eyeballs, or the hopeless efforts sometimes made to save them to the detriment of the other. With regard to the pathology of sympathetic cases the speakers all seemed to agree with him that neither the microbic theory nor that of reflex neurosis was definitely proved. There was a possibility that when scientific investigation was more perfect various kinds of microbes might be found implicating, if not actually causing, sympathetic complications. It seemed to him necessary to work carefully in the direction of seeing how far any general infection of the system (blood or organs) was present where septic uveitis had been developed in the sympathizing eye.—*British Medical Journal*.

PAMPHLETS RECEIVED.

"Neurasthenia," by J. Punton, M.D.

"Benign Laryngeal Tumors," by J. M. Ingersol, M.D.

"Our Work and Its Limitations, by E. C. Runge, M.D.

"Creuznach-Spa and Its Environments, Its History Past and Present."

"Modern Therapy of the Tympanic Cavity," by M. A. Goldstein, M.D.

"Brief Report of a Case of Fibroma of the Eyelid," by Ch. A. Oliver, M.D.

"Annual Report of the Milk Inspector of the City of St. Louis," by H. Carter, M.D.

"The Failure of Antitoxin in the Treatment of Diphtheria," by J. E. Herman, M.D.

"The Importance of Minor Choroiditic Changes, Especially Conus," by B. A. Randall, M.D.

"Five Hundred and Fifty Surgical Operations Without Alcohol, by Ch. G. Davis, M.D.

"A Review of D. W. Beaumont's Experiments on Alexis St. Martin," by S. C. Ayres, M.D.

"Retinoscopy a Crucial Test in Measuring Errors of Refraction," by B. A. Randall, M.D.

"Report on Formaldehyd Disinfection in a Vacuum-chamber," by E. K. Sprague, U.S.M.H.S.

"Hydrophthalmus; A Bibliographic, Clinical, and Pathological Study," by W. L. Pyle, M.D.

"Description of an Adjustable Bracket for the Reid Ophthalmometer," by Ch. A. Oliver M.D.

"A Brief Note on a Case of Reflex-Irritation (Urticaria and Eyestrain)," by Ch. A. Oliver, M.D.

"The Late Result in a Case of Implantation of Sponge in the Orbit After Enucleation," by S. D. Risley, M.D.

"Hyperostosis Cranii, with the Report of a Case Leading to Exophthalmus and Blindness," by F. W. Ellis, M.D.

"Description of a New Method for the Implantation of Glass Balls into the Orbital Cavity," by Ch. A. Oliver, M.D.

"Notes historique sur la clinique d'ophtalmologie de l'université royale hongroise de Budapest," by W. Schulek, M.D.

"Synechiotomy of the Stapes for Improving the Hearing in Chronic Suppurative Otitis Media Residua," by E. B. Deuch, M.D.

"Restoration of the Conjunctival Cul-de-sac in a Case of Total Symblepharon by Means of Thiersch Skin Grafts," by Ch. H. May, M.D.

"Some Points in the Symptomatology, Pathology and Treatment of the Diseases of the Sinuses, Adjacent and Secondary to the Orbit," by Ch. S. Bull, M.D.

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ORIGINAL ARTICLES.

REPORT OF ONE HUNDRED CONSECUTIVE CASES
OF CATARACT EXTRACTION.

BY SAMUEL THEOBALD, M.D., BALTIMORE, MD.,
CLINICAL PROFESSOR OF OPHTHALMOLOGY AND OTOTOLOGY, JOHNS HOPKINS UNIVERSITY—OPHTHALMIC AND AURAL SURGEON TO THE JOHNS HOPKINS HOSPITAL
AND TO THE BALTIMORE EYE, EAR AND THROAT CHARITY HOSPITAL.

AS WILL be seen from an examination of the appended tables, the cases of cataract extraction here reported are in no sense selected ones. They include two eyes which had previously been iridectomized for glaucoma, two in which there was dislocation of the lens of traumatic origin, one in which there was myopia of very high grade with extensive detachment of the retina, three in which the lens opacity was secondary to syphilitic irido-choroiditis (posterior synchiæ being present in one of them), one in which the lens was shrunken and the iris adherent to its capsule, and one myopic eye in which there had occurred previously an attack of non-specific irido-choroiditis. The only cases operated upon which I have not felt called upon to include in this report are: One case of traumatic cataract with rupture of the sclerotic, one of traumatic cataract with wound of the cornea and iris and probable lodgment of a foreign body in the eye, one of partial dislocation of the lens with iridodialysis the result of traumatism, and one of chalky cataract in an eye entirely blind from old glaucoma, in which the operation was done merely for cosmetic effect.

The Methods of Operation practiced in the one hundred cases were as follows:

Extraction with iridectomy (modified Graefe).....	52
Extraction after preliminary iridectomy (usually accompa- nied by trituration of the lens).....	26
Simple extraction.....	20
Extraction of dislocated lens in capsule.....	2

100

In all of the cases, the simple extractions as well as those combined with iridectomy, the section was made throughout its whole extent in the sclero-corneal juncture, and the formation of a small conjunctival flap was the rule rather than the exception. The iridectomy, in the cases of combined extraction, was made by a simple cut with the scissors, the aim being to make a small coloboma. Preliminary iridectomy, which, as indicated, was usually accompanied by trituration of the lens through the cornea (Förster's method), was practiced, with a few exceptions, only in cases in which the cataract was immature.

Anæsthetic.—Cocain (4 per cent. solution, with 4 per cent. boracic acid) was used in 89 cases, chloroform in 6 case, no anæsthetic in 5 cases. More recently the cocain solution has been kept in a small Florence flask, and has been sterilized by a brief boiling before each operation, the eye-dropper being similarly sterilized.

Antisepsis.—Antiseptic precautions were employed in 81 cases, simple cleanliness in 19 cases. The antiseptic precautions consisted in washing the lids and brow and flushing the conjunctival sac with a 1 to 8000 sublimate solution, the flushing being repeated four or five times during the two or three hours preceding the operation, the lids meantime being kept closed with a pad of absorbent gauze wet with the same sublimate solution, and the sterilization of the instruments by a brief immersion in boiling water. In the earlier operations the hands of the operator (which need not come in contact with the eye) were simply cleansed with soap and water, but more recently I have thought it best to immerse the hands in a 1 to 1000 sublimate solution, drying them, however, with a sterile towel before beginning the operation, as I prefer not to operate with wet hands. A 1 to 8000 sublimate solution is

used for sponging the eye during the operation, very small absorbent gauze sponges, which have previously been sterilized by boiling, being employed. In no instance, it may be remarked, have any ill effects seemed to result from the use of the bichloride solution in this strength.

Dressings and After-treatment.—In about four-fifths of the cases the lids (of both eyes) were closed by strips of isinglass plaster, no bandage being applied; but, not infrequently, especially in restless patients, a pad of absorbent cotton, kept in place by strips of rubber adhesive plaster, was used as a further protection to the eye operated upon.

My present practice is to close the lids with a comparatively narrow strip of isinglass plaster (which in some instances is omitted altogether) and over this to place a light pad of sterile gauze and absorbent cotton, which is kept in place by a Murdoch's protection shield. This shield, which is secured by strips of rubber adhesive plaster, is very light, being made of aluminium; is so constructed as to permit of free circulation of air and is, I think, the best of the contrivances of this kind—distinctly better and more comfortable to the patient than Ring's or Emerson's mask, for example.

In almost every case the operation was performed with the patient on the bed where it was intended he should remain, so as to avoid the possible risk of moving him afterwards, and here, as a rule, he was kept for the three following days. At the expiration of this time the dressings were changed, atropia instilled and, if all was well, the other eye was left uncovered and the patient was permitted to sit up. A daily application of atropia (4 grains of atropia and 10 grains of boracic acid to the ounce) was made after this, and on the seventh day the eye operated upon was left open. Up to this time, and for a few days subsequently, the patient was confined to a room which was moderately dark.

As a matter of routine, 20 grains of sulphonal or trional were given to the patient the evening of the operation, and the dose was repeated on the two or three succeeding evenings when its quieting effect seemed to be called for. Salicylate of sodium was found most useful in combatting undue inflammatory reaction occurring during the healing process.

Accidents and Complications—*Loss of vitreous humor* occurred in 6 cases (Nos. 11, 35, 62, 68, 74 and 85). In 5 of

these the loss was inconsiderable, and the success of the operation was in no wise impaired. In 1 (No. 68) the entire contents of the vitreous chamber, which were absolutely fluid (not at all different from the aqueous humor in consistence) flowed out, the eyeball collapsed and a suppurative panophthalmitis ensued. This eye, it should be remarked, had previously been iridectomized for glaucoma. Of the 5 cases of slighter loss, 3 were due to the patients contracting the lids strongly, 2 of these being in negroes, who are especially ungovernable in this respect.

In several cases *a bubble of air found its way into the anterior chamber* during the steps of the operation, an accident which I have seen happen only in cocainized eyes. In no instance, however, did this result in harm.

Iritis.—There were 7 cases of well-marked iritis, but in not a single instance was there occlusion of the pupil, and in no case was an after-iridectomy required. A slight degree of iritis, causing points of adhesion to form between the pupillary margin and the remains of the torn capsule, was common, but was not regarded as of moment.

Prolapse of Iris.—Among the 20 cases of simple extraction there were 3 in which prolapse of the iris occurred, 2 of these being sufficiently marked to require abscission. Among the combined extractions there was at least 1 case of marked incarceration of the iris, and there were, doubtless, a number of cases of slight adhesion of the iris to one or the other extremity of the corneal section, of which no special note was made.

Secondary Operations.—There were 23 cases in which dissection of the capsule was performed and 3 of these required a repetition of this operation. For this purpose Knapp's needle-knife was commonly employed. Especial care was taken with the antiseptic precautions in these cases, and no untoward results occurred. In view of the occasional infection of the eye from this seemingly trivial operation, the importance of rigid asepsis in its performance can not be too strongly emphasized.

Results.—Considering as "successes" all cases in which $V.=\frac{20}{cc}$, or better, was obtained, and including under this head 7 cases in which, though the exact vision was not recorded, the notes showed that a good visual result had been secured (Nos. 49, 50, 57, 70, 71, 72 and 82), we have—

SUMMARY :

Successes (V.= ¹⁰ / _{cc} to ²⁰ / _{xiii}).....	83
Successes (V. not recorded).....	7
<hr/>	
Total successes.....	90
Partial successes (V.= ¹⁶ / _{cc} to ¹¹ / _{cc}).....	4
Partial successes (V. not recorded).....	2
V. not improved (though recovery from operation was smooth).....	2
Losses (from suppuration).....	2
<hr/>	
	100

Of the cases designated in the above summary as "partial successes," the poor vision was due in 1 (No. 23, V.=¹¹/_{cc}) to an antecedent choroido-retinitis; in 1 (No. 69, V.=¹⁵/_{cc}) to a hæmorrhagic retinitis, recognized after a smooth recovery from the operation; in 1 (No. 97, V.=¹¹/_{cc}) to stupidity of the patient, in part, and in greater part, probably, to amblyopia, as the pupil was clear and the result of the operation, apparently, all that could be desired. In 1 (No. 24, V.=¹⁶/_{cc}) the latest test of sight was made four weeks after the operation. A considerable improvement in vision was reported to have taken place subsequently, and had the case been seen later it is probable that it could have been included in the "successes." The 2 remaining cases, those in which there was no record of vision, were No. 19, in which a partially dislocated traumatic cataract was removed without accident, and No. 20, in which a hypermature (shrunken) cataract, secondary to iritis (posterior synechiæ being present), was extracted by means of forceps. In each of these a smooth recovery occurred, but for some reason, not apparent, the visual result was not recorded.

The 2 cases in which there was no improvement in vision, though recovery from the operation was smooth, were No. 66, in which the cataract was secondary to extensive detachment of the retina in a highly myopic eye, and No. 14, in which the lens opacity was consequent upon specific irido choroiditis. A clear pupil was obtained in each case, but owing to the retinal detachment in the one and the old choroido-retinal changes in the other, no improvement in sight resulted.

Of the 2 eyes lost by purulent panophthalmitis, 1 (No. 68) has already been spoken of under the head of "loss of

vitreous humor." As has been stated, the eye had previously been iridectomized for glaucoma, and there was poor light perception in the nasal half the field. The capsule was found to be very tough, and an attempt to remove the lens (in its capsule) by engaging the cystotome in the capsule caused a rupture of the zonula and a partial dislocation of the lens. The vitreous humor, which had the consistence of water, flowed out, the eyeball collapsed, the lens fell back into the posterior chamber and was left there, after several unsuccessful attempts to remove it with a loop had been made. No surprise, of course, was felt when panophthalmitis supervened.

The other case (No 16) occurred in a negro man, 41 years of age, with a high grade of myopia. This was one of the 19 cases in which antisepsis was not practiced. The patient's other eye, beside the high grade of myopia, showed corneal nebulae from former ulcerative keratitis, and subsequent to the loss of the eye he developed an attack of suppurative tonsillitis. The cataract was a soft one and its removal was accomplished easily, and the operation (a combined extraction) completed without accident. Undue pain was experienced during the succeeding 24 hours, and within 48 hours a suppurative panophthalmitis had developed. Enucleation was practiced subsequently.

The visual acuity obtained in the successful cases, omitting the 7 in which it was not recorded, and taking the best vision in each case whether before or after discission of capsular opacity, was as follows:

Vision = $\frac{20}{13}$	1 case.
Vision = $\frac{20}{20}$	2 cases.
Vision = $\frac{20}{30}$	16 cases.
Vision = $\frac{20}{40}$	7 cases.
Vision = $\frac{20}{50}$	11 cases.
Vision = $\frac{20}{60}$	9 cases.
Vision = $\frac{20}{70}$	11 case .
Vision = $\frac{20}{75}$	4 cases.
Vision = $\frac{20}{80}$	3 cases.
Vision = $\frac{20}{100}$	8 cases.
Vision = $\frac{20}{120}$	4 cases.
Vision = $\frac{20}{200}$	7 cases.
<hr/>	
Total.....	83 cases.

The visual tests were not all made at 20', a number having been made at 15' and 16', as is indicated in the tables which follow; but, to make the above summary more intelligible, I have, in these cases, substituted fractions of the same value having 20 as the numerator. I may add, that the summary does not quite do justice to the visual results obtained, for there were a number of cases in which the vision was recorded as $\frac{20}{xxx}+$, $\frac{20}{xx}-$, $\frac{20}{xL}-$, etc., and these slight differences have been ignored, the cases being classed as having vision corresponding only to the type which they could read without error.

Included in the series there were, as has been stated, 20 cases of simple extraction. Among these there were no losses, and, as to visual results, all were successes except case No. 69, already spoken of, in which the rather poor sight obtained ($\frac{15}{cc}$) was due to retinitis hæmorrhagica. There were, however, 3 cases of prolapse of the iris, and while only 2 of these were sufficiently extensive to require abscission, they induced in me a lack of confidence in the method, the outcome of which has been an adherence, for some time past, to the modified Graefe extraction—a section throughout in the sclero-corneal juncture, a narrow conjunctival flap, and a small iridectomy made by a single snip with the scissors.

ONE HUNDRED CONSECUTIVE CASES OF CATARACT EXTRACTION.

No.	Name, Sex, Age, Nationality, Gen'l Health.	Character of Cataract, Functional Examination.	Operation Method and Incidents.	Healing Process.	Vision.	Secondary Operations.	Ultimate Vision.	Remarks.
1	M. L., F., 68. Amer. (col'd) Good.	Hard, mature. Normal.	Extraction after preliminary iridectomy.	Normal.	$\frac{20}{80}$; declined 18 mos. later, the last to $\frac{20}{400}$ from wrinkling of capsule. $\frac{20}{200}$.	Two discs. One with two needles	$\frac{20}{30}$ (?)	. . . .
2	M. C., F., Unrecorded.	Hard, hypermature. Myopic. Normal.	Extraction after preliminary iridectomy.	Normal.	$\frac{20}{200}$.	. . . .	. . . .	Ophthalmoscope showed evidences of old choroido-retinitis, explaining poor vision.
3	K. D., F., 43.	Hard, hypermature, semi-fluid cortex, tough capsule. Normal.	Extraction with iridectomy. A good deal of semi-fluid cortex left.	Normal.	$\frac{20}{30}$.	. . . .	. . . .	. . . .
4	G. V., M., 55. Germ., Good.	Hard, mature. Normal. L. F.	Extraction with iridectomy.	Normal.	$\frac{30}{70}$.	. . . .	. . . .	See following case for operation on other eye.
5	G. M., M., 56. Germ., Good.	Hard, mature R. E.	Extraction with iridectomy.	Rather persistent iritis.	$\frac{20}{200}$.	Dissection with needle-knife.	$\frac{20}{50}$.	. . . .
6	Mrs. H., F., 55. German, Good.	Hard, mature. Normal.	Extraction with iridectomy.	Normal, though two days after operation patient struck eye with hand.	$\frac{20}{30}$.	. . . .	. . . .	. . . .
7	J. H., M., 82. Irish, Good.	Hard, mature, amber-colored. Field contracted to nasal side.	Extraction with iridectomy. Cornea collapsed.	Normal.	$\frac{20}{60}$.	. . . .	. . . .	Ophthalmoscopic evidences of old choroido-retinitis.
8	A. C., F., 40. Mulatto.	Hard, mature, secondary to syphilitic irido-choroiditis.	Extraction with iridectomy. Capsule tough. Enlargement of corneal section necessary.	Normal.	$\frac{20}{200}$.	. . . .	. . . .	Marked pathological changes in choroid and retina, explaining low visual activity.

			Extraction after preliminary iridectomy.	Normal. Considerable cortex left.	Subsequent decline to 11/200 from capsular opacity.	Subs-	Discission.	20/100.	
9	E. H., F., 54. German, Fair.	Hard, mature, ripened rapidly after Förster's operation. Normal.		Normal.					
10	E. M. C., F., 72. American, Fair.	Hard, mature, as result of Förster's operation. Normal.	Extraction after preliminary iridectomy.	Normal.					
11	Mrs. L., F., 61. German, Fair.	Hard, mature, as result of Förster's operation. Normal.	Extraction after preliminary iridectomy. Considerable cortical matter left after delivery of nucleus and slight loss of vitreous, caused by efforts to remove this.	Iritis.	20/10.		Discission, followed by undue inflammatory reaction.	20/70 (?).	Eye bore operative interference badly.
12	J. H., M., 70, Negro.	Hard, mature.	Extraction with iridectomy.	Normal.	15/40.				
13	F., M., 85, Good.	Hard, mature. Normal.	Extraction with iridectomy.	Normal.	20/70.				Previous to extraction, divided canaliculus for relief of epiphora and consequent conjunctivitis.
14	G. S., M., 27, American, Fair.	Soft, mature, secondary to syphilitic iridochoroiditis. Pupillary adhesions to lens-capsule. Light perception poor. Field much contracted.	Extraction with iridectomy. Some blood and cortex left in pupillary area. Conjunctival flap.	Normal.	0				Eye recovered well from operation, but the imperfect light perception present before operation was lost. Syphilitic choroïdo-retinitis explained poor result.
15	E. A., F., 85, Negro, Good.	Hard, mature. Normal.	Extraction with iridectomy.	Normal.	15/40.				
16	C. C., M., 41, Negro, Fair.	Soft. Probably secondary to myopia of high grade. Normal.	Extraction with iridectomy. Whole of lens soft—no nucleus. Operation smooth in all respects. Small conjunctival flap.	Suppurative panophthalmitis supervened, and eye was subsequently enucleated.	0				A suppurative tonsillitis followed shortly after the panophthalmitis.

TABLES CONTINUED.

No.	Name, Sex, Age, Nationality, Gen'l Health.	Character of Cataract, Functional Exam nation.	Operation, Method and Incidents.	Healing Process.	Vision.	Secondary Operations.	Ultimate Vision.	Remarks.
17	L. McA., F., 84, American, Good.	Hard, mature, amber-colored. Fingers counted at 6'.	Extraction with iridectomy. Conjunctival flap.	Normal.	20/70.	.	.	.
18	J. H. H., M., 69, American, Good.	Hard, mature. Normal.	Extraction after preliminary iridectomy.	Normal.	20/70 +.	.	.	.
19	C. A. J., M., 54, Negro, Good.	Traumatic. Lens partially dislocated (loose in hyaloid fossa). Normal.	Lens extracted in capsule without iridectomy and without use of traction instrument. A small head of vitreous prolapsed, but returned, leaving lips of wound in good apposition. Conjunctival flap.	Normal.	No record.	.	.	.
20	Mrs. R., F., 50, American, Fair.	Hard, hypermature (shrunk). Secondary to iritis. Posterior synechia.	Extraction after preliminary iridectomy. Lens removed with forceps.	Normal.	Case recorded as "doing well" on leaving hospital 18 days after operation, but no record of vision.	.	.	.
21	H. V. W., M., 62, American, Fair.	Hard, mature. Normal.	Extraction with iridectomy. Eye closed with plaster strip.	Normal.	20/75.	.	.	This was the first case in which I employed plaster strips to close the eyes, as a substitute for the bandage.

				13/2000.	Discission.	20/2000.	
22	G. C., F., 29, American. Poor.	Soft. Secondary to severe and neglected syphilitic irido-choroiditis. Posterior synchia. Good light perception.	Linear extraction after previous iridectomy. Capsule tough and thickened. Tried to extract it with forceps but failed, as it resisted a safe degree of traction.	Normal. Capsular opacity left.		.	.
23	M. McP., F., 65, Irish. Fair.	Hard, mature. Secondary to irido-choroiditis and myopia.	Extraction after preliminary iridectomy.	Normal. Capsular opacity.	Discission.	11/2000, though patient says she can "thread a needle."	Pupil clear. Extensive pathological changes in choroid and retina (old) explain poor vision.
24	G. F., M., 75, American. Good.	Hard, mature, amber-colored. Normal, fingers at 8".	Extraction with iridectomy. Nucleus exceptionally large and delivered with some little difficulty.	Normal, except that neither atropia nor duboisia could be used without causing conjunctivitis.	.	.	.
25	J. H., M., 81, American. Good.	Hard, mature. Normal.	Extraction with iridectomy.	Normal.	.	.	.
26	B. D., M., 65, Negro. Good.	Hard, mature. Normal. R. E.	Extraction with iridectomy.	Normal.	.	.	See following case for operation on other eye.
27	B. D., M., 65, Negro. Good.	Hard, mature. Normal. L. E.	Extraction with iridectomy.	Normal.	.	.	.
28	D. L. W., M., 54, American. Ch. diarrhoea.	Hard, mature, whitish in color, small nucleus. Normal. R. E.	Extraction with iridectomy.	Normal.	.	.	See following case for operation on other eye.
29	D. L. W., M., 54, American.	Hard, mature. Normal. L. E.	Extraction with iridectomy.	Normal.	.	.	.

TABLES CONTINUED.

No.	Name, Sex, Age, Nationality, Gen'l Health.	Character of Cataract. Functional Examination.	Operation. Method and Incidents.	Healing Process.	Vision.	Secondary Operations.	Ultimate Vision.	Remarks.
30	M. J., F., 53, American.	Hard, mature. Normal.	Extraction after preliminary iridectomy.	Normal.	20/40 +.	.	.	.
31	M. A. M., F., 50, American, Fair.	Hard, mature, as result of Förster's operation. L. E.	Extraction after preliminary iridectomy.	Normal.	20/30.	.	.	Simple extraction subsequently performed on other eye. See Case 53.
32	S. C., F., 44, Negro.	Hard, mature (?). Normal.	Extraction after preliminary iridectomy.	Normal.	20/45 +.	.	.	.
33	M. McL., F., Age not recorded, Irish.	Semi-soft, mature. Normal.	Extraction with iridectomy.	No record.	20/50.	.	.	.
34	N. I., F., 65, Negro, Good.	Hard, nearly mature. Normal.	Extraction after preliminary iridectomy and titration of cortex.	Normal.	15/70.	.	.	.
35	Mrs. H., F., 70, American, Fair.	Hard, nearly mature.	Extraction with iridectomy. Slight loss of semi-fluid vitreous. A good deal of cortex left.	Capsular opacity.	15/200.	Discission.	20/300.	.
36	H. P., F., 79, Negro, Good.	Hard, mature. Normal.	Extraction with iridectomy.	Normal, except that healing of corneal section was slow, suggesting incarceration of a bit of capsule.	20/100.	.	.	.
37	E. H., F., 60, Germ., Good.	Hard, mature. Normal.	Extraction with iridectomy.	Normal.	20/100 +.	.	.	Ophthalmoscope shows a large posterior staphyloma in this eye.

TABLES CONTINUED.

No.	Name, Sex, Age, Nationality, Gen'l Health.	Character of Cataract, Functional Examination.	Operation, Method and Incidents.	Healing Process.	Vision.	Secondary Operations.	Ultimate Vision.	Remarks.
46	E. M., M., 53, American.	Hard, fairly mature, as result of Förster's operation. Normal.	Extraction after preliminary iridectomy.	Normal.	15/20.	.	.	Cataract began as a post-polar opacity.
47	R. F., F., 70, Negro.	Hard, hypermature, fluid cortex, cholesteroline crystals under anterior capsule. Normal. L. E.	Simple extraction.	Normal. Central, round pupil.	15/50 (?).	.	.	See following case for operation on other eye.
48	R. F., F., 70, Negro.	Hard, nearly mature. Normal. R. E.	Simple extraction.	Normal. Round pupil.	20/50 (?).	.	.	Some unabsorbed cortex present at time V. was tested. With the disappearance of this V. probably improved considerably. See following case for operation on other eye.
49	A. P., F., 67, Irish.	Hard, mature. L. E.	Simple extraction.	Normal. Round, central and free pupil obtained.	Not recorded. Note simply states, "result excellent."	.	.	
50	A. P., F., 67, Irish.	Hard, mature. R. E.	Simple extraction.	Normal. Piniform pupil.	Not recorded. Note merely states when and what glasses were prescribed. 15/40.	.	.	
51	S. B., F., 65, Negro.	Hard, mature.	Simple extraction. A sudden movement of patient during division of capsule entangled cystostome in iris.	Normal. Pupil nearly central; slightly drawn toward central section.		.	.	

52	A. T., F., 60, Negro.	Hard, mature.	Simple extraction. Pupil not quite central. Some cortex left.	Iris found prolapsed on third day. Ab-scission of prolapse (which was not diminish- ing) on 35th day after extrac-tion.	Normal. Central pu-pil, without synechie.	15/70.	Discission.	20/30.	L. E. had been previ-ously operated upon for cataract. See Case 31.	.	.	.
53	M. A. M., F., 53, Fair, Am.	Hard, mature. Normal. R. E.	Simple extraction.	Normal. Central pu-pil, without synechie.	Normal. Central pu-pil, without synechie.	20/50 (?). Cap-sular opacity.	Discission.	20/30.	L. E. had been previ-ously operated upon for cataract. See Case 31.	.	.	.
54	C. H., F., 77, American.	Hard, hypermature.	Simple extraction.	No record.	No record.	15/45 (?).	.	.	.	.	.	.
55	E. G., F., 75, Negro.	Hard, mature.	Simple extraction.	No record.	No record.	20/100.	Discission.	20/70 +.	.	.	.	.
56	E. A., F., 60, Negro, Fair.	Hard, immature. Re-cent attack of acute glaucoma in this eye, for which I did an iridectomy.	Extraction after iridecto-my for glaucoma. Much cortex left.	Normal. Cortex slow in absorbing.	Normal. Cortex slow in absorbing.	.	Discission performed twice.	20/30 —.	For operation on other eye see Case 60.	.	.	.
57	V. W., F., 67, Amer., Fair.	Hard, mature. R. E.	Simple extraction.	Normal.	Normal.	.	.	.	Case did well, but shortly after patient left hospital and before a record of V. was made she was accidentally struck in this eye by a horse shoe (with such force as to render her un-conscious). General inflammation of the eye followed by phthisis bulbi ensued and enucleation was performed. See Case 98 for operation up-on other eye.	.	.	.

TABLES CONTINUED.

No.	Name, Sex, Age, Nationality, Gen'l Health.	Character of Cataract, Functional Examination.	Operation, Method and Incidents.	Healing Process.	Vision.	Secondary Operations.	Ultimate Vision.	Remarks.
58	W. F., M., 70, American.	Hard, mature, amber-colored. Counts fingers, can distinguish letters J. No. 20.	Simple extraction. Cornea collapsed after removal of lens, but soon resumed its normal state.	Normal.	$20/30$ +.	.	.	.
59	E. O., F., 63, Negro.	Hard, mature.	Simple extraction. Anterior chamber douched with boracic acid solution.	Normal.	$20/100$ +.	.	.	.
60	E. A., F., 60, Negro, Fair.	Hard, mature.	Simple extraction.	Round, central pupil obtained. Prolapse of iris, followed by abscission some days later.	$11/200$. Capsular opacity.	Dissection.	$20/100$ (?)	For operation on other eye see Case 56.
61	L. D. H., F., About 70, Amer., Fair.	Hard, mature, dark amber-colored ("black cataract"). Normal. Marked arcus senilis.	Simple extraction. A minute bubble of air left in anterior chamber.	Normal. Round, central pupil; iris drawn slightly forward opposite center of corneal section.	$20/75$.	.	.	.
62	E. G., F., 50, Negro.	Hard, mature, very white in color. Normal. History of blow on this eye 6 or 7 years since and of failure of sight soon afterward.	Extraction with iridectomy. Attempted to do a simple extraction, but owing to small size of pupil found it difficult to deliver lens, so made an iridectomy. Some vitreous lost, patient very unruly.	Normal.	$20/60$.	.	.	.
63	J. E. T., F., 66, Amer., Poor. Cancer of breast, of which she died some months later.	Hard, mature. Eye myopic. Normal.	Extraction after preliminary iridectomy. Poor anaesthesia from cocaine. Patient behaved badly, section made with difficulty and had to be enlarged with scissors.	Some iritis.	$20/60$.	.	.	.

TABLES CONTINUED.

No.	Name, Sex, Age, Nationality, Gen'l Health.	Character of Cataract, Functional Examination.	Operation. Method and Incidents.	Healing Process.	Vision.	Secondary Operations.	Ultimate Vision.	Remarks.
69	M. M., F., 72, Negro.	Hard, mat re, amber-colored.	Simple extraction.	Normal. Central, nearly round pupil.	15/300.	. . .	. . .	Poor V. due to hemorrhagic retinitis discovered after operation.
70	W. B., M., About 70, American.	Hard, hypermature. Normal.	Simple extraction.	Normal. An excellent result was obtained, but patient did not return to hospital for examination for glasses and no record was made of vision.	No record.	. . .	. . .	. . .
71	M. V., F., 84, Amer., Poor.	Hard, mature. Normal.	Extraction with iridectomy.	Capsular opacity which was needled by me and later in Richmond, Va.	. . .	Two discussions.	No record of V. after first needling; but excellent V. is said to have followed 2d discussion; ability to read, sew, etc. This lasted for nearly two years, when hemorrhagic retinitis occurred, and V. became very poor.	. . .

72	M. T., F., 84, Amer., Poor.	Hard, mature. Pupil responded poorly to cocaine and homatropia.	Extraction with iridectomy.	Normal.	(Good result obtained, but patient failed to report for examination for glasses. No record of V. was made.	12/90 +.	.	.	.	.	.
73	C. J., M., 67, American.	Hard, mature.	Extraction after preliminary iridectomy, and "trituration of cortex."	Rather persistent inflammation with tendency to + T. which yielded finally to mercury.	.	.	.	.	.	.	.
74	C. M. M., M., About 70, Amer., Poor.	Hard, mature. Normal.	Extraction with iridectomy. Some vitreous lost after removal of speculum, from patient contracting lids strongly.	Normal.	20/200.	20/60 +.	Discission.	.	.	.	.
75	J. S., M., 74, Amer., Fair.	Hard, fairly mature. Normal. Pupil responds poorly to atropia.	Extraction with iridectomy. Cornea small. Nucleus exceptionally large. Some difficulty in delivering lens, though section included nearly half the circumference of cornea.	Normal.	15/45	.	.	.	.	.	.
76	M. S., F., About 70, Irish, Good.	Hard, fairly mature, amber-colored. Normal.	Extraction after preliminary iridectomy and "trituration of cortex."	Normal.	20/70 —.	20/30 —.	Discission of a slowly developing capsular opacity.	Three years later decline of V. from capsular opacity. Discission, giving V. = 20/30 +. See Case 86 for operation on other eye.	.	.	.
77	J. F. V., M., 65, German.	Hard, mature, secondary to myopia of high grade.	Extraction after downward and inward (sic) iridectomy by another surgeon.	.	20/200.	.	.	After extraction marked choroido-retinal change (old) found with ophthalmoscope.	.	.	.

TABLES CONTINUED.

No.	Name, Sex, Age, Nationality, Gen'l Health.	Character of Cataract Functional Examination.	Operation. Method and Incidents.	Healing Process.	Vision.	Secondary Operations.	Ultimate Vision.	Remarks.
78	A. P. W., F., About 78. Amer., Fair.	Hard, mature. Normal.	Extraction with iridectomy. A small bubble of air left in anterior chamber.	Normal, except the occurrence of entropion of upper lid, which was corrected by one application of colloid.	$20/120$ —. Some capsular opacity.	. . .	. . .	. . .
79	S. O. McC., M., 76., Am.	Hard, mature, dark amber-colored.	Extraction with iridectomy.	Normal.	$20/60$ +.	. . .	. . .	. . .
80	J. A. J., M., 45, American.	Hard, mature. Normal.	Extraction with iridectomy.	Normal.	$20/13$.	. . .	. . .	For operation on other eye see Case 87.
81	G. W. M., M., 76, American, Fair, Recent fracture of leg.	Hard, hypermature. Normal.	Extraction with iridectomy.	Normal.	$20/40$ +.	. . .	. . .	. . .
82	J. S., M., 75. Amer., Good.	Hard, mature, dark amber-colored. Normal, can count fingers.	Extraction with iridectomy.	Normal. Therecord is: "Case did well, some capsular opacity."	Not recorded.	. . .	. . .	. . .
83	F. G., F., About 65. Amer., Poor.	Hard, immature, small nucleus. Very slow in developing. Normal. Counts fingers.	Extraction seven months after preliminary iridectomy, with "trituration of cortex."	An unusual amount of cortex left. Recent attacks of "descemetitis" at intervals for six months.	$20/100$ (?).	Dissection.	$20/50$ —.	. . .
84	M. R., F., 56. Negro.	Hard, mature.	Extraction with iridectomy.	Normal.	$16/30$ —.	. . .	. . .	For operation on other eye see Case 88.

85	L. M., F., 70. Negro.	Hard, hypermature. Normal.	Extraction in capsule without iridectomy. When about to perform iridectomy patient contracted lds strongly, forcing out lens in capsule with some loss of vitreous humor. Iris did not prolapse or appear in section, but pupil looked as though an iridectomy had been performed.	Normal. Eye still looks as though it had been iridectomized.	$16/100$.	. . .	. . .	For operation on other eye see Case 89.
86	M. S., F., About 70, Irish, Good.	Hard, mature. Normal.	Extraction with iridectomy.	Normal.	$20/40$ +.	Dissection two years afterwards, vision having declined from capsular opacity.	$20/40$ +.	For operation on other eye see Case 76.
87	J. A. J., M., 45, American, Good.	Hard, not fully mature. Normal.	Extraction with iridectomy.	Normal.	$20/20$ (?).	. . .	. . .	For operation on other eye see Case 80.
88	M. R., M., 56, Negro.	Hard, mature. Normal.	Extraction with iridectomy.	Normal.	$17/50$ —. Still some cortical matter present.	. . .	. . .	For operation on other eye see Case 84.
89	L. M., F., 70. Negro.	Hard, hypermature. Normal.	Extraction with iridectomy.	Uneventful.	$15/100$ (?).	Dissection three weeks after extraction.	Not recorded.	For operation on other eye see Case 85.
90	H. J. P., F., 64, Mula to, Good.	Hard, mature. Normal.	Extraction with iridectomy. Point of knife caught in iris, but was free and section completed satisfactorily. Some cortex left.	Normal, except rather extensive incarceration of iris in each extremity of wound.	$16/200$.	Dissection three months after extraction.	$20/40$.	A floating opacity noted in vitreous humor at the time record of V. was made.
91	S. S., F., 62, Negro.	Hard, mature. Normal.	Extraction with iridectomy.	Complicated by serious iritis, with tendency to high T.	$20/70$.	. . .	. . .	. . .

TABLES CONTINUED.

No.	Name, Sex, Age, Nationality, Gen'l Health.	Character of Cataract. Functional Examination.	Operation. Method and Incidents.	Healing Process.	Vision.	Secondary Operations.	Ultimate Vision.	Remarks.
92	M. A. H., F., 65, American, Good.	Hard, mature. Normal.	Extraction with iridectomy.	An unusual amount of pain followed operation, attended by nausea and vomiting, which lasted for 24 hrs. Some iritis.	$20/20$ —.	.	.	(Diosyncrasy to atropia and, to a less degree, to the other mydriatics, which excited a follicular conjunctivitis accompanied by much irritation.
93	M. C. S., F., 70, American, Poor, Epithelioma upon cheek.	Hard, mature. Normal.	Extraction with iridectomy.	Uneventful.	$20/100$.	Dissection four months after extraction.	$20/40$ —.	.
94	J. P. C., M., 70, American, Fair.	Hard, mature. Normal.	Extraction with iridectomy.	Normal.	$20/120$.	.	.	V. was tested on 19th day after operation, and he was not seen after this date.
95	M. P., F., 57, Negro.	Hard, mature, as result of Förster's operation three months previously.	Extraction after preliminary iridectomy.	Uneventful. A small hemorrhage observed in retina to nasal side of optic disc.	$20/40$ —.	.	.	Förster's operation was followed by very rapid ripening of cataract—a marked change in condition of lens occurring within one week. A firm posterior synechia also occurred at each pupillary angle of coloboma.

96	R. E., M., 66, Negro. Hard, mature. Normal.	Extraction with iridecto- my.	Uneventful	$20/30$ +.	. . .	. . .	. . .	. . .
97	Mrs. H., F, 77, American, Fair.	Extraction with iridecto- my.	Normal.	$11/200$	. . .	. . .	. . .	Poor V. in this case due partly to stupidity of patient and in greater part, probably, to amblyopia, as pupil was clear and mechanical result of operation all that could be desired.
98	V. W., F., 70, American, Poor.	Extraction after prelimi- nary iridectomy (Förster's operation).	Normal.	$20/70$.	. . .	. . .	. . .	After operation, appearance of fundus of eye suggestive of previous myopia. For operation on other eye see Case 57.
99	M. A. J., F., About 70, Amer., Good.	Extraction with iridecto- my.	Normal.	$20/50$ (Slight capsular opacity).	. . .	. . .	. . .	. . .
100	F. D. S., F., 66, American.	Extraction with iridecto- my.	Normal.	$20/50$. Subsequent decline of vision from capsular opacity.	Discission four months after extraction.	$20/50$ +.	. . .	. . .

A NEW STATIONARY OPHTHALMOSCOPE WITHOUT REFLEXES.

BY WALTER THORNER, M.D.

TRANSLATED BY CARL BARCK, M.D., ST. LOUIS, MO.

[CONCLUDED FROM PAGE 345, NOVEMBER NUMBER.]

DESCRIPTION OF THE INSTRUMENT.

HAVING thus considered the general laws which govern the observation of the ophthalmoscopic picture, I shall describe the apparatus constructed by me, a horizontal section of which is given in figure 8. O_2 represents the eye of the patient, O_1 that of the physician. The distance between the pupils of the two eyes is 22.5 cm., if both are emmetropic. AB and CD are two biconvex lenses of ordinary crown glass, whose focal distance is the same, 7.5 cm.; their diameter is 5 cm. EF is a smaller plano-convex lens, also of 7.5 cm. focal length. The pupil of O_2 is situated approximately in the focus of AB . The distance between AB and CD is 7.5 cm., between CD and EF also 7.5 cm. All lenses are centered.

The unbroken lines represent the path of one pencil emitted from a point of the retina, the dotted lines the limits of all the pencils. In front of the pupil O_2 there is placed a prism of total reflection, P , in such a manner that it covers one half of the pupil, and that one of its equal sides remains 1 cm. distant from the cornea. By means of this prism the illumination from a small petroleum flame L is carried through the three lenses $A'B'$, $C'D'$ and $E'F'$, which correspond to AB , CD and EF , in size, focal length and relative distance from each other. From the figure it is apparent; first, that all the pencils re-enter the pupil of the observer, so that the field of view is not diminished; second, that the rays emitted from a given point are reunited upon the retina of the observer, so that a distinct image is produced. Directly in front of the lamp there is a diaphragm $G'H'$, with a semicircular aperture of 4 mm. radius. The straight line bounding the semicircle is placed vertical to and goes through the optic axis, whilst

the arc is directed toward G' ; in consequence the image of this small semicircle is formed by the lenses $A' B'$, $C' D'$ and $E' F'$, and after total reflection in the prism P , exactly upon that portion of the cornea which is shown in the figure to the left of MM . The portion of the cornea to the right of MM remains dark, but the retina to the right of MM is

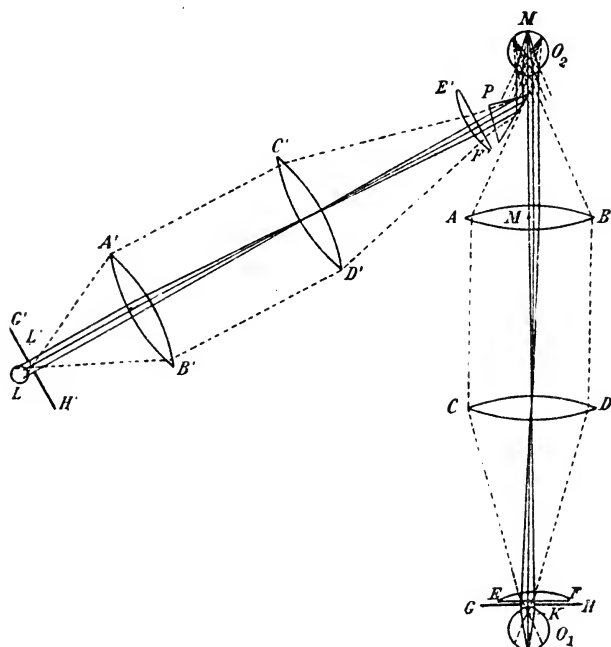


FIG. 8.

illuminated; therefore all rays which are reflected from the cornea meet to the right of the aperture in the diaphragm GH , and O' receives light from the patient's retina exclusively through the non-illuminated portion of the cornea to the right of MM ; there are, in consequence, no reflexes.

The field of view and the magnification in this arrangement has been calculated above (p. 338 November number), resulting in a field of 37° in the magnitude of the upright image. The degree of brightness according to the principles analyzed (p. 343, *Ibid.*) remains to be calculated.

In the constructed apparatus only one half of the pencil emitted from a given point of the observed fundus reaches the

source of light. The illumination is, therefore, one half of the maximal $=\frac{1}{2} \times 16\pi = 8\pi$. The pencil emitted from a given point of the fundus of the observer reaches in its entirety the pupil of the observed, because the aperture in the diaphragm, through which the observer looks, is pictured entirely upon the half of the pupil of the observed in natural size. The brightness is, therefore, always maximal up to the point where the pupil of the observer becomes as large as half the pupil of the observed. This may be assumed, because the intensity of the light returning from the fundus is feeble, so that the pupil is considerably dilated during observation. It is then $=8\pi$. As product we get $8\pi \times 8\pi = 64\pi^2$, which is the same brightness as in the inverted image. As a further advantage each part of the retina of the observed eye is but half as much blinded as in the usual observation in the inverted image.

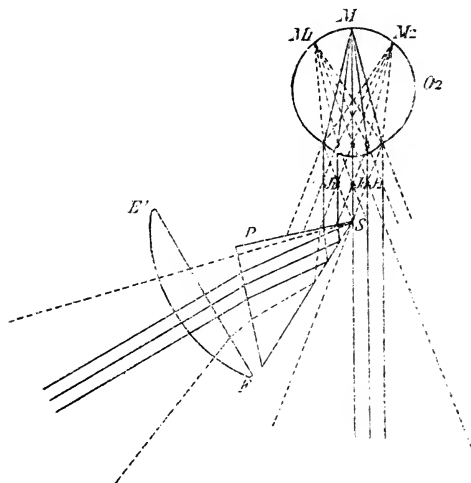


FIG. 8a.

In figure 8a the path of rays within the eye O_2 and in its neighborhood is represented on a larger scale. We see three pencils, each composed of parallel rays after their exit from the pupil of O_2 . The middle one, drawn in unbroken lines, emanates from the point M of the retina, the one directed toward the right from M_1 , the other from M_2 . Only the left half or a portion of each of these parallel pencils serves for illumination of the respective point of the retina and only the right

half or a portion of it is used for observation. It is apparent that only such points can be simultaneously illuminated and observed, from which rays reach the point J_1 , the image of L_1 (Fig. 8) and the point J_2 , the image of K (Fig. 8). These points, J_1 and J_2 , are situated upon the center of the lines which can be drawn from the edge of the prism to the left and right margins of the pupil of O_2 . Their distance is equal to half the diameter of the pupil. M_1 and M_2 represent, therefore, the limits of the field of view. Its magnitude is

$$= \frac{J_1 J_2}{J_0 S} \text{ or } = \frac{\text{diameter of pupil}}{\text{distance of iris from edge of prism.}}$$

Supposing that the distance of the iris from the edge of the prism to be 10 mm., the pupil of O_2 must have a diameter of 6, 7 mm., in order that the field of view amounts to $\frac{2}{3}$ in the horizontal direction (as calculated above). If the pupil is smaller, the field of view of the apparatus in the horizontal direction is not utilized entirely, but it remains unchanged in the vertical direction. Furthermore, it is evident from figure 8a, that the brightness of single points of the retina decreases gradually towards the right and left, whilst it remains the same for all points upon the vertical line. But this decrease in brightness is practically of small importance.

As regards the external appearance of the apparatus a full view is given in figure 10, as seen from the position of the observer. It consists of two tubes, which form an acute angle with each other. At the apex of this angle the prism is situated and there also is the aperture into which the patient looks. The tube which serves for observation can be extended for the adjustment to the different states of refraction. For the high degrees of hyperopia and myopia two extra oculars are provided, which can be readily exchanged. For illumination, there is at the end of the tube a petroleum lamp, and closely in front of this is the diaphragm with an aperture of the form and size of half the cornea (Fig. 9).

The apparatus, as a whole, is firmly connected with the lamp and is movable with it upward and downward by one screw, and to the right and left by another screw. These movements are necessary in order to follow easily the motions of the patient's eye. The patient places his chin upon a rest provided in front of the apparatus. Another contrivance is

necessary in order to find the correct position of the apparatus in reference to the eye. For this purpose I have added a box, in which two prisms are placed, on the right side of the tube for observation. The one serves for adjustment by the observer himself, whilst he examines the patient, by the other the apparatus may be adjusted for the inexperienced observer by a person standing on the right side of it.



FIG. 9.

It is very easy to survey a large field of view, if the pupil is dilated. One can see at the same time the macula and the optic disc if the direction of the observer is such that these points are seen at the opposite sides of the field of view. The magnification is the same as in the upright image and there appear no reflexes at any direction of the visual axis.

The apparatus can be used for demonstration of the ophthalmoscopic picture to an inexperienced observer as well as for minute examinations. Although the magnification is not larger than that in the upright image, it is possible to recognize finer details, because the observation is considerably easier and because single spots can be examined much longer. One can see, for instance, around the larger blood-vessels fine longitudinal striæ, which I take to be the distribution of the non-medullated nerve fibers.

An artificial dilatation of the pupil is necessary in the large majority of patients, because it contracts considerably on account of the magnitude of the illuminated field. It is best to use for dilatation homatropine without the addition of cocaine, because the latter sometimes produces changes in the cornea, which interfere with the distinctness of the im-

age. For the examination of the eyes of animals, which from their construction are less convenient for examination than the human eye, for instance, rabbits, it is better to adjust the apparatus so that only $\frac{1}{3}$ of the pupil is used for illumination and $\frac{2}{3}$ for observation, in order to look through the central portion

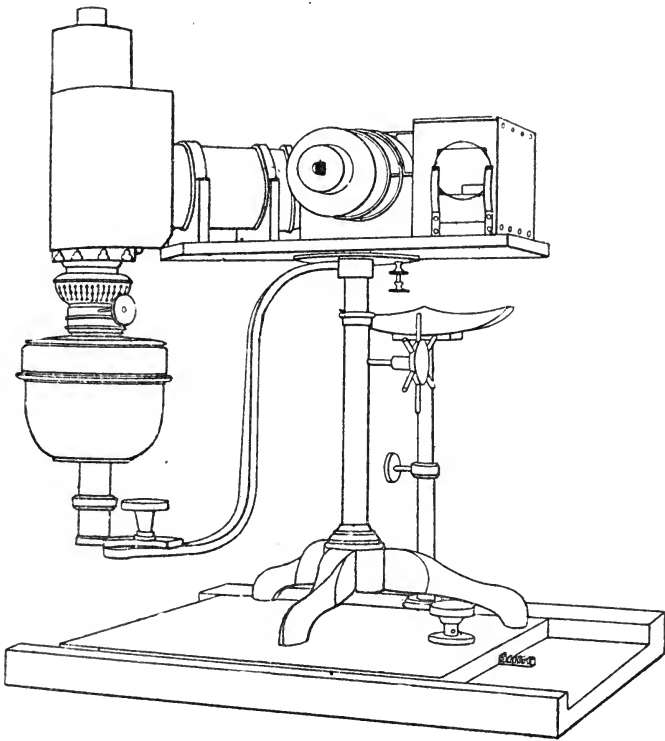


FIG. 10.

of the eye, which gives the best pictures. In the same manner as with other ophthalmoscopes the different methods which are used for the determination of refraction may be combined with this apparatus. The photography of the fundus may thus also be greatly facilitated.

The instrument is furnished by the firm of F. Schmidt & Haensch, 4 Stallschreiberstrasse, Berlin, S.

CORRESPONDENCE.

THIRTEENTH INTERNATIONAL MEDICAL CONGRESS. PARIS, AUGUST, 2-9, 1900.

Editor AMERICAN JOURNAL OF OPHTHALMOLOGY:

I herewith inclose you a circular containing the rules and regulations of the XIIIth International Congress of Medicine, to be held in Paris, August 2-9, 1900.

You will note that all doctors of medicine may become members of this Congress by making the proper application and paying \$5. The Secretary-General in Paris has instructed the American National Committee to receive the applications of American physicians and to return a receipt for the amount sent. These applications and the money are then to be forwarded to Paris, and in due time cards of admission to the Congress will be distributed to all subscribers.

Members desiring to present papers will forward the title and a résumé before May 1, 1900, to the Secretary of the Section to which they belong, for each Sectional Committee reserves to itself the right of drawing up its own working programme.

The Committee trusts you will give the French circular and the means of procedure by which physicians become members of the Congress due notice in your journal, as it is extremely desirable that the American profession have a full representation in the International meeting of 1900.

AMERICAN NATIONAL COMMITTEE.

Drs. Wm. Osler, Chairman; G. M. Sternberg, W. K. Van Reyphen, Walter Wyman, W. W. Keen, H. P. Bowditch, O. F. Wadsworth, H. G. Miller, E. D. Fisher, G. J. Engelmann, H. W. Stelwagon, Samuel Johnston, Robert F. Weir, A. Jacobi, E. G. Janeway, James Bell, H. M. Sherman, R. H. Chittenden, Burt G. Wilder, Henry Koplik, and B. Holly Smith. H. Barton Jacobs, Secretary.

BALTIMORE, MD., November 1, 1899.

DEAR DOCTOR.—The American National Committee of the XIIIth International Medical Congress, to be held in Paris, from the 2d to the 9th of August, 1900, in connection with the French Exposition, has been organized as above indicated.

All doctors of medicine are entitled to membership in this Congress by making the proper application and paying the sum of \$5. The Secretary-General in Paris has instructed the American National Committee to receive the applications of American physicians, and for this purpose a blank form is inclosed, upon which is to be written the full name and address, degrees and any position of note held, together with the Section of the Congress to which the writer wishes to belong; a visiting card should be appended. These forms, with the \$5, are to be returned to the Secretary of the National Committee; he in turn will send receipt and forward the slips and money to Paris, where they will be registered, and in due course of time a card of admission to the Congress mailed to each applicant.

The Committee hopes the American representation in this extremely important Medical Congress may be as large as possible, and they would urge every member of the profession to enter his name for membership, this alone entitling him to receive a digest of the full proceedings of the Congress and the printed report of the Section to which he belongs.

[Communications respecting the delivery of these reports to members to be addressed to M. Masson, publisher of the proceedings of the Congress, 120 Boulevard St. Germain, Paris.]

H. BARTON JACOBS,
3 W. Franklin St., Baltimore, Md. *Secretary.*

SECTION OF OPHTHALMOLOGY.

M. Panas, President; MM. Javal, and Gayet, Lyons, Vice-Presidents; M. Parent, 26 Avenue de l'Opéra, Paris, Secretary-General; MM. Chevalcreau and Rochon Duvigneaud, Assistant Secretaries.

Members.—MM. Abadie, Badal, Hocquard, Jocqs and Lagrange, Bordeaux; Bruch, Algiers; Chauvel and Chibret, Clermont-Ferrand; Dor, Lyons, Landolt and de Lapersonne,

Lille, Meyer and Rohmer, Nancy; Terson, Trousseau and Truc, Montpellier.

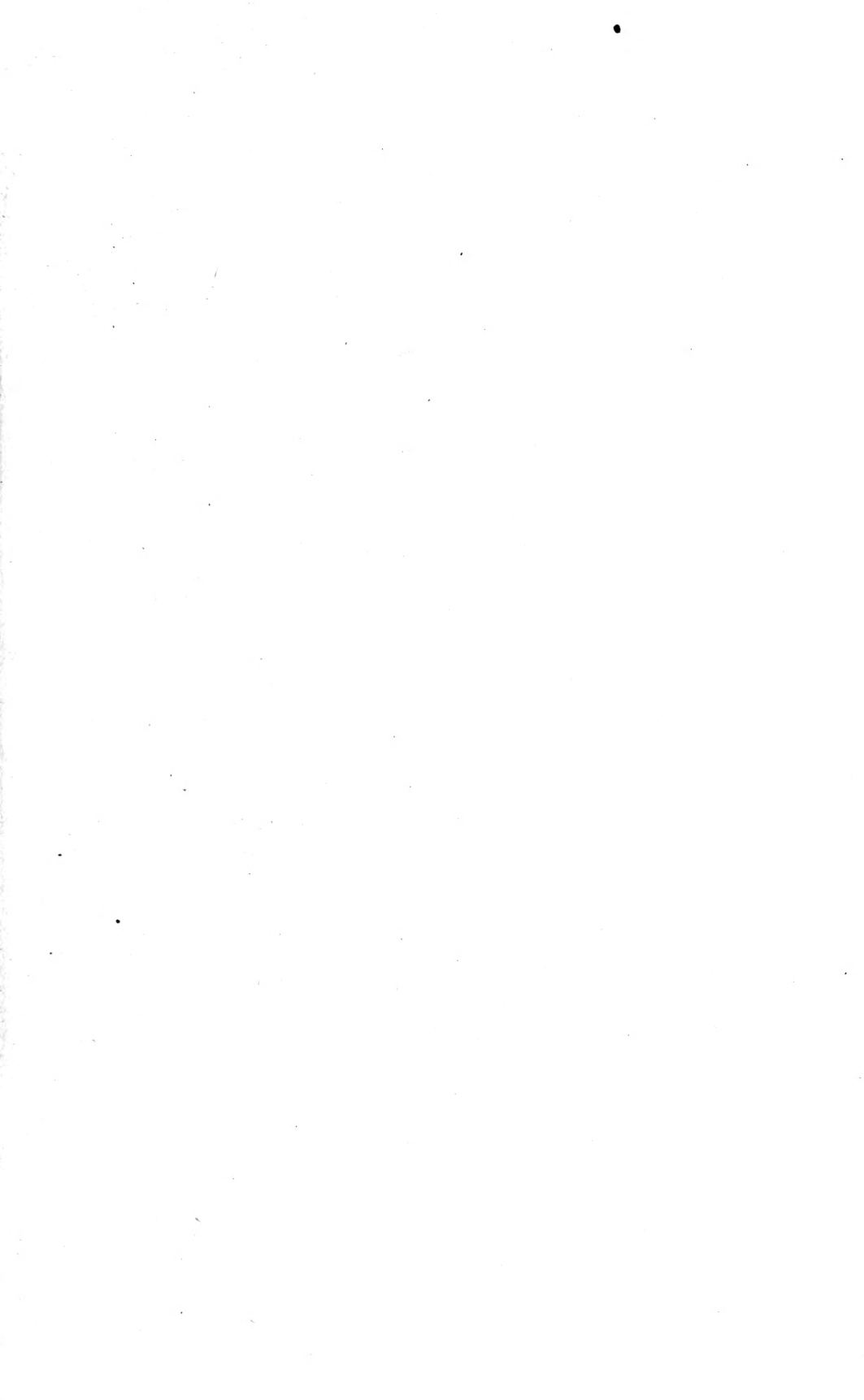
Papers.—1. "Optic Neuritides of an Infectious and of a Toxic Origin," by Bellarminoff, St. Petersburg; Nuel, Liège; and Uhthoff, Breslau.

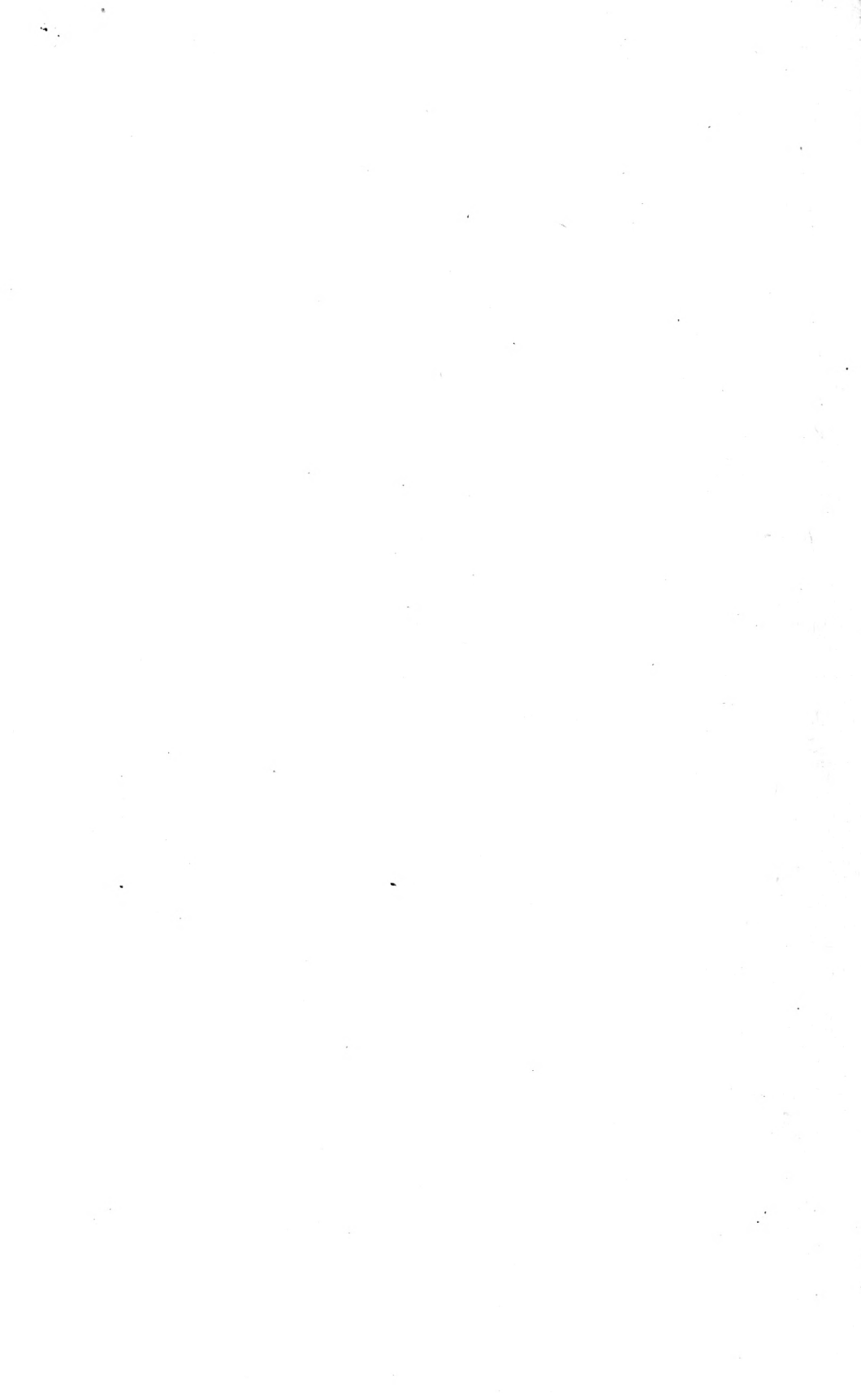
2. "Cortical Center of Vision," by Bernheimer, Vienna; Angelucci, Palermo; and Henschen, Upsala.

3. "Comparative Value of Enucleation and of the Operation Suggested to Replace It," by Pflüger, Berne; Snellen, Utrecht; R. H. Swanzy, Dublin; and de Schweinitz, Philadelphia.

NEWS ITEM.

In the fourth volume of "Sajou's Annual and Analytical Cyclopedia of Practical Medicine," the article on Diseases of the Lens, is, by mistake, credited to Dr. Edward Jackson. It was written by Dr. F. W. Marlow, of Syracuse, who deserves the credit for an excellent presentation of the subject.





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